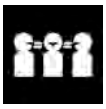
The Coordinator-General

Byerwen Coal project:

Coordinator-General's evaluation report on the environmental impact statement

July 2014

The Department of State Development, Infrastructure and Planning is responsible for driving the economic development of Queensland.



The Queensland Government is committed to providing accessible services to Queenslanders of all cultural and linguistic backgrounds. If you have difficulty understanding this publication and need a translator, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone the Queensland Department of State Development, Infrastructure and Planning on (07) 3227 8548.

Disclaimer: This report contains factual data, analysis, opinion and references to legislation. The Coordinator-General and the State of Queensland make no representations and give no warranties regarding the accuracy, completeness or suitability for any particular purpose of such data, analysis, opinion or references. You should make your own enquiries and take appropriate advice on such matters. Neither the Coordinator-General nor the State of Queensland will be responsible for any loss or damage (including consequential loss) you may suffer from using or relying upon the content of this report. By using or relying on such information you agree to indemnify the Coordinator-General and the State of Queensland against any loss arising out of or in relation to your use or reliance.

An electronic copy of this report is available on the Department of State Development, Infrastructure and Planning's website at **www.dsdip.qld.gov.au**

Contents

Appendices

Figures

Tables

Synopsis

This report evaluates the potential impacts of the Byerwen Coal Mine project (the project). It has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act).

The proponent, Byerwen Coal Pty Ltd, proposes to construct an open-cut greenfield coal mine with a yield of up to 10 million tonnes per annum (Mtpa) product coal for export. The project is located 20 kilometres (km) west of Glenden and 140 km west of Mackay in the Northern Bowen Basin. It is situated within the Isaac Regional Council (IRC) and Whitsunday Regional Council (WRC) local government areas.

The project has a 50-year life and consists of six mining lease applications (MLAs) covering a project area of approximately 22 697 hectares (ha). The expected project disturbance footprint within this area is 6998 ha. The project will require A$1.76 billion of investment. From year five of operations the project is predicted to directly contribute $289 million annually to the Mackay, Isaac and Whitsunday region and an estimated $143 million annually to the Queensland economy. The project could create up to 350 jobs during the construction phase and 545 jobs during the operational phase.

In evaluating the environmental impact statement (EIS), I have considered the EIS documentation, issues raised in submissions during the public consultation periods, the additional information to the EIS (AEIS), information and advice I have received from state government agencies, IRC, WRC, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) and the Australian Government Department of the Environment (DE).

The following provides an overview of my evaluation.

Matters of national environmental significance

Threatened ecological communities

An ecological community is a naturally occurring group of plants, animals and other organisms that are interacting in a unique habitat. An ecological community becomes threatened when it is at risk of extinction. The project disturbance footprint has been located in areas already cleared, which minimises impacts on native vegetation and threatened ecological communities (TECs). However, based on the assessment of potential impacts of the project against the Australian Government's Significant Impact Guidelines[1], the project has the potential to result in significant residual impacts (post avoidance and mitigation measures) on three TECs listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The impact includes a reduction of 316 ha of Brigalow (*Acacia harpophylla dominant and co-dominant*) ecological community (Brigalow TEC), 84.4 ha (including a 5.4 ha buffer) of Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Native Grasslands TEC) and 18 ha of Semi-evergreen vine thickets of

[1] Department of Environment, Water, Heritage and the Arts (DEWHA – now the Department of the Environment), Matters of National Environmental Significance – *Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*, Canberra, 2009.

the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT TEC). Vegetation clearing for the project also impacts on the habitat of a threatened species (Ornamental snake).

I acknowledge that the impacts of the project will be further analysed and refined during the next phases of the project and therefore areas of clearance for TECs may change. I have recommended conditions of approval to the Commonwealth Minister for the Environment, for maximum disturbance limits for land containing Brigalow TEC, Natural Grasslands TEC and SEVT TEC and requiring offsets to address the residual impacts of the three TECs to be managed, monitored and legally secured. I will determine and approve any State offset conditions for impacts to state significant biodiversity values (SSBV) if they are considered necessary over and above the Australian Government offset requirements.

The proponent proposes land-based offsets for these three TECs. There are suitable offsets available on land within the project area that is not identified for development and on pastoral properties owned by the proponent and affiliated companies within 150 km of the project in the Brigalow Belt Bioregion.

Threatened species

The Squatter pigeon (*Geophaps scripta scripta*) and Ornamental snake (*Denisonia maculata*), both terrestrial fauna species listed as threatened under the EPBC Act, were recorded in the project area during fauna surveys. There were no threatened flora species recorded in the project area.

The project has the potential to impact on 395 ha of habitat for the Ornamental snake. The assessment of potential offset areas in the project area determined that sufficient habitat for the Ornamental snake occurs outside the project disturbance footprint. Additionally, there are 9700 ha of non-remnant area in the project area that could be assessed for suitability if required for habitat.

The EIS has determined that 1074 ha of remnant vegetation that contains potential habitat for the Squatter pigeon will be cleared or impacted by the project. While there are likely to be significant residual impacts on the Squatter pigeon, the offset requirements are already addressed in the offsets proposed for the TECs. These offsets will result in offset benefits for the Squatter pigeon. The proponent has also committed to mitigation measures to mitigate impacts on fauna. These measures would benefit the Squatter pigeon, including having a spotter-catcher search for nests and fauna when clearing habitat areas, staging clearing to allow fauna to migrate and minimising vegetation clearance in proximity to water .

Two individual birds suspected to be the Black throated finch (BTF) were observed (without a positive identification) during baseline surveys near the large wetland in the south-west of the project area. As there are no previous records of this species in or near the project area, it is thought that these individuals may have travelled along the Suttor River following consecutive years of high summer rainfall providing suitable foraging and watering locations. The proponent has committed to mitigating impacts on the BFT by conducting detailed searches of nesting habitat near the Suttor River riparian corridor and existing dams as well as replicating suitable habitats.

I have recommended conditions of approval to the Commonwealth Minister for the Environment, for maximum disturbance limits for land containing potential habitat for these species and requiring offsets for residual impacts on habitat and for the development of a management plan by the proponent for MNES species and communities.

Migratory Birds

Five species listed as migratory under the EPBC Act were recorded during fauna surveys in the project area. These species were the Eastern great egret (*Ardea modesta),* White-bellied sea-eagle (*Haliaeetus leucogaster*), Latham's snipe (*Gallinago hardwickii*), Rainbow bee-eater (*Merops ornatus*) and Rufous fantail (*Rhipidura rufifrons*). A further five listed migratory species are likely to occur within the project area as the species were previously recorded nearby and/or suitable habitat is present. These species are the Cattle egret (*Ardea ibis*), Fork-tailed swift (*Apus pacificus*), White-throated needletail (*Hirundapus caudacutus*), Australian painted snipe (*Rostratula australis*), and Satin flycatcher (*Myiagra cyanoleuca*).

Unavoidable vegetation for the life of the project will reduce available habitat for migratory species, with the loss of 2391 ha of remnant native vegetation and 21.4 ha high value regrowth. The effects of land clearance on migratory birds will include loss of vegetation communities for foraging and breeding, reduced species abundance and biodiversity, loss of connectivity between habitat areas, removal of riparian vegetation associated with Suttor Creek and removal of permanent water sources associated with the wetland habitat and the two dams.

These effects of land clearance will be offset by a net conservation gain achieved through the proponent's commitment to land based offsets for TECs and threatened species which protects the associated habitat value in perpetuity. The proponent will develop a management plan to minimise threats to migratory birds, such as predators, and proposes land-based management techniques to improve the quality of ecosystems for migratory species to forage and nest.

The potential impacts to migratory species in the project area are not considered significant because the species are highly mobile and capable of relocating with changes in the availability of suitable habitat.

Water resources

Groundwater

The project will involve mining coal seams below the regional water table and it will be necessary to conduct dewatering of the eight open-cut coal mine pits. The project is not located in a government regulated groundwater management area. The proponent is able to take groundwater for its production purposes, or passively through mine dewatering, without the need for authorisation. I am satisfied that there will be no impact on groundwater directly from process water requirements as the proponent has advised that water will be imported to site from the Burdekin-Moranbah pipeline. Mine dewatering will occur and impact on the groundwater.

There is very little groundwater of any significance in the project area. The groundwater in its natural state is generally brackish to saline and of poor quality. I have stated conditions for the draft environmental authority (EA) that the proponent must not release contaminants to groundwater and must monitor and investigate any exceedance of set groundwater quality or groundwater level limits. The aquifers are limited in hydraulic connectivity, and there is negligible or no groundwater–surface water interaction across the project area. The project area is 200 km east of the closest section of the Great Artesian Basin (GAB) and the groundwater associated with the project has no relevance to the GAB. No groundwater-related activities other than extraction for mine dewatering or agricultural use exist in or adjacent to the project area within the coal measures.

There are no alluvial aquifers of significance in the project area. Aquifers beneath the project area occur in a number of stratigraphic units and there is a lack of hydraulic connection between these units across the project area. Together with the extremely slow recharge rates, any predicted localised drawdown of groundwater caused by open-cut pit mining activities within specific aquifers is considered unlikely to affect the hydrogeological recharge regime in any aquifer, outside the predicted drawdown extent.

An analytical hydrogeological modelling method was adopted to provide estimates of groundwater inflows into the eight mine pits for various stages of the mine life and to model the extent of groundwater drawdown. South Pit 1 and North Pit 1 are predicted to have the highest inflows of groundwater.

An estimate of potential groundwater drawdown associated with the project dewatering activities was modelled. Based on the proponent's mine planning calculations, South Pit 1 in year 46 of the project life will have a maximum depth of 380 metres (m) below ground level, which is nominally 320 m below the existing water table. The base of the residual void for South Pit 1 will be 3.6 km long and 0.16 km wide. Groundwater drawdown will be at its maximum 320 m below the existing water table, and will gradually diminish as distance from the pit increases. South Pit 1 will induce drawdown in the local catchment a distance of 2.3 km from the pit. There are no groundwater users, groundwater-dependent ecosystems (GDE) or hydraulic connections to the Suttor River within that distance of South Pit 1.

South Pit 1 is the deepest and most extensive of the pits and as such is considered most likely to represent a 'worst-case scenario' of the eight mine pits for drawdown of groundwater levels around the project area resulting from pit dewatering. The modelled drawdown specific to each of the pit depths and spatial extents, indicates:

- drawdown does not extend under the Suttor River at any point, with the closest point being 650 m away and, as such, no impact on baseflow is expected
- drawdown does not extend to any private landholder bores
- drawdown does not go under the palustrine wetland of high ecological significance located on the western boundary of the project area.

The EIS concluded that the project would not modify groundwater levels necessary for the survival of Brigalow TEC and Natural Grasslands TEC located outside of the project's disturbance footprint. Figure 8.8 of this report shows the maximum extent of

groundwater drawdown resulting from the project. In addition, the modelling confirms that there are no private landholder bores, palustrine wetlands or rivers impacted by predicted drawdown of the project.

Further information on groundwater-surface water interaction in the vicinity of the palustrine wetland on the western boundary of the project area will be obtained from a monitoring bore at the wetland to provide evidence of any relationship between the wetland and groundwater levels impacted by dewatering of the open-cut pits. I have stated conditions for the draft EA requiring a groundwater compliance bore at the wetland to be monitored quarterly and any fluctuations of water level reported and investigated.

I have evaluated the impacts of the project on groundwater quality and drawdown as it relates to ecological communities and landholders. There were no users of groundwater identified within or surrounding the project. I accept the proponent's conclusion that this creates a low risk of impact on other groundwater users in the area.

I have stated and recommended conditions to avoid impacts, including the implementation of a comprehensive groundwater monitoring program. The groundwater monitoring program will be implemented by the proponent within the project area for the life of the project using the dedicated groundwater monitoring bores to accurately measure any actual drawdown impacts from the pits as they are developed and remedial action taken.

Surface Water

The project is located within the Rosella Creek and Upper Suttor River sub-catchments of the Bowen River catchment and Suttor River catchment respectively, which are both part of the headwaters of the Burdekin Basin. The key watercourses directly impacted by the project are Kangaroo Creek and a tributary of Kangaroo Creek, which drain the northern portion of the mine, and a tributary of the Suttor River, which drains the southern portion. Kangaroo Creek and the Suttor River are both ephemeral in nature. The Suttor River discharges into the Belyando River, which drains into the Burdekin Falls Dam.

The proponent proposes to release treated mine-affected water to the Suttor River and Kangaroo Creek. The release of mine affected water to these nearby waterways is aimed at managing the quantity of water stored within the project area to balance water inputs (rainfall, groundwater inflow and surface runoff) and losses (evaporation, dam seepage, dust suppression and releases to the environment). The releases are proposed to occur through a controlled release strategy that allows discharge only when specific flow and water quality criteria are satisfied through testing and monitoring. I have stated a number of conditions for the draft EA to manage the water releases of the mine and limit any potential impacts on surface water quality. The proponent has also made a range of commitments to protect surface water quality.

Modelling predicted a 43 per cent reduction in flows to the palustrine wetland for a period of approximately 16 years, resulting from the operations of the project. I require the proponent to monitor changes to the palustrine wetland so that mitigation measures can be taken to ensure rehabilitation will return functionality of the wetland close to or better than its pre-development condition.

The proposed monitoring and reporting program will also enable further investigations to be made into groundwater–surface water interactions under the wetland. I have stated a condition for the draft EA requiring a receiving environment monitoring program (REMP) related to the wetland to be put in place.

I require a water management plan to be developed and implemented for the site that will manage water course diversions until they are stable. The rehabilitation objectives in relation to the water course diversions aim to ensure the diversion design mirrors natural stream functions and achieves a stable channel and appropriate erosion rates. The proponent has committed to monitor the physical and biological condition of water course diversions and has provided rehabilitation criteria that aim to ensure that vegetation will be re-established and fauna can safely return to the water courses. I have set conditions for rehabilitation criteria in Table BY1 for the draft EA. I am satisfied the impacts of the diversions can be appropriately managed and mitigated.

Flood modelling showed that in a 1000-year event the mine pits will not be affected by floodwaters from the Suttor River. The probable maximum flood (PMF) flood event reaches the south-western corner of South Pit 1, which will be bunded to prevent inflow. The final void in South Pit 1 will not be affected by the PMF flood event. The proponent will construct drainage diversions to mitigate against flooding of the open pits and final voids from drainage lines and water courses that intersect the proposed open pits. The pit voids will also be protected from ingress of overland flow that may result in overtopping of the voids during the mine life or after mine closure. It is highly likely that void water will not be discharged to the surrounding environment, thus avoiding impact on aquatic ecology in surrounding waterways and wetlands. I am satisfied that there will be no impacts on the region's surface water from the final voids, given the fact that the modelling has predicted that no water will ever be discharged by overtopping.

The environmental management plan (EM Plan) (version 4 dated May 2014) for the project outlines a range of control strategies and commitments to manage and mitigate potential impacts on surface water hydrology and geomorphology during construction and operation. I have stated a condition requiring the implementation of an erosion and sediment control plan for all stages of mining activities.

I am satisfied that the addition of the project's operations to the existing mines in the Bowen Basin will not have a significant additional impact on the surface and groundwater resources of the basin. The proponent has a water management strategy, a proposed mine water management system for the project and a modelled mine site water balance which considers all rainfall and groundwater inflows. I am satisfied that with the implementation of these management measures, the proponent commitments to manage water resources and my stated conditions for the draft EA, the project will not have a significant impact on water resources.

Land use and rehabilitation

The primary existing land use in the project area is cattle grazing. There are also 1430 ha of potential strategic cropping land (SCL) that may be impacted by the project. The project will impact on 1638 ha of Class A agricultural land, 4258 ha of land suitable for beef cattle grazing and 1636 ha of land suitable for non-irrigated broad acre cropping

by progressively replacing this use with mining activities over the 50-year project life. The proponent has committed to entering into compensation agreements with relevant land holders for impacts to agricultural land and to consider allowing the ongoing use of land not affected by project activities for grazing (Appendix 6, commitments 142 and 433).

The proponent conducted an on-ground assessment of SCL as mapped by the Queensland Government in the project area and submitted applications to the Department of Natural Resources and Mines (DNRM) to assess the validity of the mapping. One application related to Suttor North Station (Lot 689 on SP251696) has been decided and recorded as non-SCL in the DNRM decision register. The validation application to validate the remaining potential SCL has yet to be decided by DNRM.

The proponent will develop a landscape rehabilitation plan for around 5700 ha of disturbed areas. The plan will be designed to achieve a self-sustaining landform or have maintenance requirements consistent with a post-mining land use that will be agreed to with relevant landowners. Four of the eight mine pits will be completely backfilled and revegetated. The proponent proposes that the remaining four open-cut mine voids, with a total area of 1342 ha and up to 350 m deep, will remain permanently in the landscape after mine closure.

Impacts related to the future use of voids and ensuring human safety around the void were addressed in the EIS. The proponent has committed to making the voids safe by fencing and earth bunding to prevent access for people and livestock. The area of land will not be suitable for agriculture, grazing or any other use due to the void size, steep sides, shape and salinity of pit lake water.

The desired long-term outcome is that these voids be filled in and the land returned as close as possible to a sustainable use including grazing and agriculture. I have stated conditions in Appendix 2 to minimise the size of the void remaining after mining activities cease and progressively rehabilitate land disturbed by mining in accordance with the rehabilitation completion criteria in Table BY1 for the draft EA.

Land in the project area is also used for water, power and transport infrastructure not owned or operated by the proponent. This includes local roads and State roads, two stock routes, a coal rail line, a water pipeline and a power line.

The mine footprint will result in the closure of a stock route that traverses east west across the property. DNRM has advised that there is an acceptable alternative route to the south of the Byerwen project site, so connectivity of the network will be retained. I have recommended a condition in Appendix 3 to ensure that the section of the north south stock route on the mining lease is not impacted.

The proponent consulted owners of existing power, rail and water infrastructure that traverse the site in order to find ways to minimise impacts. Further consultation will need to be undertaken with these owners during the detailed design phase. I am satisfied with the proponent's commitments to consultation, stakeholder engagement and entering into the commercial agreements at a suitable time with the relevant party.

Terrestrial and aquatic ecology

The project is situated within the Brigalow Belt North Bioregion in the Burdekin River catchment. There are nine threatened fauna species under the Nature Conservation (Wildlife) Regulation 2006 that are either known to occur or considered likely to occur in the project area and that could be impacted by the development. This includes the Blacked-throated finch (endangered) and Ornamental snake (vulnerable).

Impacts to terrestrial flora and fauna values will result from vegetation clearing and the related habitat loss. The project disturbance footprint covers an area of 6998 ha including 2391 ha of remnant native vegetation to be cleared to establish open-cut mine pits and supporting mine infrastructure, resulting in a reduction of 779.1 ha of threatened vegetation communities. The remnant vegetation to be cleared is classified as 'no concern' (1612.8 ha), 'endangered' (313.9 ha) and 'of concern' (465.2 ha) Regional Ecosystem (RE) types.

One fish and three aquatic plants species listed as priority species under the Aquatic Conservation Assessment (ACA) for riverine and non-riverine wetlands of the Great Barrier Reef Catchment were recorded in the project area. The fish species of Purple-spotted gudgeon was recorded in the Suttor River and a tributary of the Suttor to the west of the proposed site of South Pit 1 and in the palustrine wetland located west of West Pit 1. Three macrophyte (aquatic plants) species were recorded in the palustrine wetland. Potential impacts to aquatic flora and fauna include reduced water quality, loss of riparian vegetation and wetland habitat and related loss of waterway biodiversity.

To mitigate impacts on terrestrial and aquatic flora and fauna, the proponent has proposed to conduct progressive rehabilitation during the life of the mine. An offset strategy has been developed by the proponent to compensate for residual impacts on threatened species. Other management measures have been outlined by the proponent in its EM Plan and list of commitments. I have also recommended a condition to address impacts to endangered, vulnerable and near threatened fauna under the *Nature Conservation Act 1992* (NC Act).

Waste

The project will generate both non-mineral and mineral related wastes. Over 1200 tonnes per annum of non-mineral waste, 20 million litres (ML) per annum of sewage, 6150 ML per annum of coal process water, 6998 ha of cleared vegetation waste, and 210 Mtpa of mineral-related waste rock will be generated in the project area during operations. The proponent has committed to manage non-mineral related wastes in accordance with the waste management hierarchy principles in the *Environmental Protection (Waste Management) Policy 2000.* The hierarchy involves avoiding, re-using and recycling of waste, then disposal as a last resort. Waste will be recycled on-site or transported off-site to either a local landfill, the Glenden Waste Facility or to a regulated waste facility. Waste tyres and decommissioning waste may be disposed of in the open pits if it is determined there is no risk of contamination to groundwater. The project's waste management plan will describe the management measures to protect environmental values from the impact of waste

The project will have an on-site sewage treatment plant. Waste-water will be pumped to holding dams or tanks and used for irrigation. Bio solids will be transferred to a local waste water treatment facility for disposal. An irrigation management plan will be developed to manage waste waters. In addition to these measures, I have stated conditions for the draft EA in Appendix 2, Schedule G to manage the treatment and release of sewage to avoid contamination and harm to people and the environment.

The project proposes two methods of mine waste management for the project. Fine and mid-size waste rock rejects (3 to 5 Mtpa) will be mixed together and disposed of in dams known as co-disposal dams located at both the northern and southern coal handling processing plants. Where feasible, these waste rock rejects will subsequently be placed into mine pits. The proponent has committed to construct the co-disposal dams in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* and any other relevant codes and guidelines.

Remaining rock waste will be stockpiled adjacent to the mined areas and will be progressively backfilled into the mine pits, after a period of approximately three years. A mine waste management plan will guide the placement of waste rock into mine cells.

To ensure the appropriate management of wastes associated with the project I have stated a number of conditions in Appendix 2 for the draft EA. Condition C1 and C2 control the burning of waste on site to ensure environmental harm is not caused. Condition C3 ensures tailings are disposed of and managed to avoid release to the environment, appropriate records are kept of tailing disposal locations and that rehabilitation and ongoing monitoring of disposal locations occurs.

Air quality

The project may impact local and regional air quality through dust generation if not carefully managed. Modelling conducted for dust generation showed that any potential impacts can be adequately managed through the dust control measures proposed by the proponent in the EIS. The dust management plan, as addressed in the EM Plan, will guide the sequential and incremental implementation of dust control measures. Monitoring data from dust deposition gauges and meteorological data will be used to predict exceedances of air quality objectives and implement appropriate control strategies.

I have stated conditions in Appendix 2 to minimise dust nuisance at sensitive and commercial places and ensure appropriate sampling and monitoring methods are used by the proponent to achieve compliance.

Gaseous emissions, such as carbon dioxide, oxides of nitrogen and sulphur dioxide from the project have been assessed as potentially having a localised impact which is unlikely to exceed emission objectives beyond the project area.

Noise and vibration

The EIS identified eight sensitive receptors (station homesteads) potentially impacted by both noise and vibration impacts, and a cultural heritage site, a railway and gas and water pipeline infrastructure as potentially affected by vibration impacts.

Noise modelling for the EIS indicated that all acoustic quality standards can be met at all sensitive receptors during the day, evening and night time periods with the implementation of the proponent's proposed control strategies stated in the EM Plan. The EIS indicated that blasting vibration and overpressure standards can be adhered to at all sensitive receptors, homesteads, buildings and infrastructure.

The EM Plan requires auditing to be undertaken to assess the effectiveness of control strategies and ensure that compliance with the standards is achieved. The EM Plan requires a noise monitoring program to be developed in the event of a complaint.

I have stated a range of conditions for the draft EA regarding noise and vibration for the project in Appendix 2.

Traffic and road impacts

The road impact assessment in the EIS demonstrated that the project will generate additional traffic on State roads and local roads. The proponent has committed to implement measures to reduce project traffic including encouraging the workforce to use bus transport from Mackay and Glenden to site. The pavement impact assessment in the EIS demonstrated that the extra construction and operational traffic could have an adverse impact on road pavements, intersections and crossings unless mitigated. The proponent will upgrade impacted intersections and construct two new site access intersections in order to maintain the safety, condition and efficiency of the road network.

An updated impact assessment will be required during the detailed design stage of the project for submission to the Department of Transport and Main Roads (DTMR) and the IRC to gain agreement on an impact mitigation program prior to construction. A future assessment of the northern intersection is to be conducted and submitted to DTMR prior to construction in year 16 of the project life. I have made a number of recommendations in Appendix 3 to mitigate the impacts of project related traffic.

Social and local economic impacts

A social impact assessment (SIA) was completed for the project to identify its potential social impacts and the proponent's mitigation measures. The proponent assessed their workforce requirements for the various construction and operation phases over the life of the project to estimate workforce numbers and develop a workforce accommodation strategy. A total workforce of 350 people is estimated for the initial two year construction stage with a total operational workforce of up to 545.

The proponent will encourage local and regional residents to take up employment opportunities offered by the project by providing a choice of accommodation options and liaising with relevant employment organisations about opportunities to achieve the highest possible proportion of local and regional employees.

The proponent is seeking to acquire sufficient land in Glenden to provide housing for a proportion of the workforce. The percentage of the workforce who choose to live in Glenden will not be known until the workforce is employed. Workers may choose to live permanently in residential housing in Glenden or alternatively they may live in other towns and commute to work by car, proponent provided bus from Mackay or fly to

Mackay from other locations. The proponent's strategy for provision of operational workforce housing and the accommodation village in Glenden is currently based on an assumption that 30 per cent of workers might chose to live in Glenden with 70 per cent commuting. This percentage may vary over the life of the project.

The SIA identified the potential impacts of this workforce requiring mitigation, management and monitoring as:

- increased temporary and permanent accommodation requirements
- increased demand on existing social infrastructure facilities and services, for example the Glenden state school, Glenden community health centre and recreational facilities
- increased demand for mental and emergency health services and allied health services, for example occupational therapy and physiotherapy
- road safety impacts due to increased traffic on local roads and highways
- impact on regional skill shortages, health and safety concerns and engagement with the local community.

The proponent has committed to the following actions to enhance, avoid, mitigate and manage social impacts:

- temporary and permanent housing will be provided in Glenden, including a worker accommodation village and residential accommodation
- a workforce accommodation strategy that aims to maximise local residency to assist management of employee turnover and absenteeism as well as strengthen the community
- working collaboratively with the Glenden Stakeholder Engagement Group and in partnership with IRC in relation to the Royalty for the Regions to prioritise core community and social infrastructure
- engaging with health care agencies and professionals to address impacts
- implementation of a traffic management plan to avoid impacts on road safety of the local community
- maximising local employment opportunities, including under represented and disadvantaged groups and providing training and development opportunities for people locally and regionally, for example:
  - employment opportunities during the construction and operations of the project will be open to local residents of Glenden and the broader region
  - working with local and regional schools, technical colleges and private providers to develop training and skills development
  - providing a bursary program to support education goals of Indigenous students and education grants for tertiary studies
- adopting the Queensland Resources and Energy Sector Code of Practice for Local Content and implementing strategies to build capacity for local service providers and businesses
- implementation of a safety and emergency management plan and a workers code of conduct

- ongoing stakeholder and community engagement to address specific SIA impacts.

The project could provide increased employment, education, training and business opportunities and reinvigoration of the Glenden community and have a net positive social effect on local and regional communities following the implementation of the social impact mitigation and management strategies and actions committed to by the proponent. I have imposed a condition in Appendix 1 for the proponent to report annually for a period of five years on the effectiveness of all proposed social impact strategies and actions from the commencement of construction and I require all commitments to be fully implemented.

Environmental management plan, proponent commitments and conditions

The proponent will manage the environmental impacts of the project by implementing mitigation measures in accordance with my conditions and recommendations, the EM Plan and the proponent commitments. I require the proponent to fully implement the commitments as detailed in the proponent commitment register (Appendix 6).

The provisions of the EM Plan will be implemented through the project EA under the *Environmental Protection Act 1994.* This report includes stated conditions in Appendix 2 for a substantially complete and outcome-focused draft EA, which will ensure the effective environmental management and monitoring of activities on the mining lease. The proponent's EM Plan and the EA apply to the mining lease area. They do not apply to the proposed worker accommodation village proposed to be built in Glenden which will be subject to a separate impact assessment process under the *Sustainable Planning Act 2009.*

I have made recommendations in Appendix 3 regarding conditions for future state government approvals for the project, including approvals under the *Transport Infrastructure Act 1994, Land Act 1994*, *Water Act 2000* and the NC Act, and recommendations for future Commonwealth approvals under the EPBC Act.

Coordinator-General's conclusion

I consider that the environmental impact assessment requirements of the SDPWO Act for the Byerwen Coal project have been met and that sufficient information has been provided to enable a thorough evaluation of the potential impacts of the project.

I conclude the project can deliver overall local, regional and state benefits. The predicted environmental impacts can be acceptably avoided, minimised, mitigated through the implementation of the management measures and proponent commitments outlined in the EIS documentation. The conditions I have specified in this report have been formulated in order to further manage and monitor the predicted impacts associated with the project.

Accordingly, I approve the project to proceed subject to the conditions and recommendations set out in this report and the proponent obtaining all subsequent statutory approvals. In addition, I require the proponent's commitments to be fully implemented.

This report will be provided to the Commonwealth Minster for the Environment, pursuant to section 36(2) of the SDPWO Regulation and the bilateral agreement

between the State of Queensland and the Australian Government to support a decision on the controlled action for this project pursuant to section 133 of the EPBC Act.

A copy of this report will also be provided to the proponent, IRC, WRC and relevant state government agencies, and will be made publicly available at **www.dsdip.qld.gov.au**

Barry Broe

.....

Barry Broe
Coordinator-General

2 July 2014

1. Introduction

This report has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) for the Byerwen Coal project (the project).

The report:

- summarises the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels
- presents an evaluation of the project, based on information contained in the EIS, additional information for the EIS (AEIS), submissions made on the EIS and information and advice from advisory agencies
- states conditions and makes recommendations under which the project may proceed
- documents proponent commitments.

2. About the project

The proponent for the project is Byerwen Coal Pty Ltd (Byerwen Coal), a joint venture between QCoal Pty Ltd (QCoal) and JFE Steel.

The proponent proposes to establish an open-cut coal mine in Queensland's northern Bowen Basin. The initial advice statement (IAS) for the project referred to the possibility of an underground mine component. Following release of the terms of reference (TOR) for the EIS and further subsequent mine planning during investigations, Byerwen Coal has advised that underground mining will not form part of the project.

A resource of approximately 650 million tonnes (Mt) of economically recoverable coal has been defined. The project is expected to produce an average of approximately 15 million tonnes per annum (Mtpa) run-of-mine (ROM) coal and 10 Mtpa product coal for the export through the Port of Abbot Point coal terminal. Production will primarily be high-quality washed coking coal and some washed thermal coal with the potential to market a crushed raw coal. The project has a 50-year project life comprising two years for construction, 46 years of mining operation and two years for decommissioning and rehabilitation.

The project is located approximately 20 km west of the mining township of Glenden, 60 km south of Collinsville and approximately 140 km west of the regional centre of Mackay within the Whitsunday Regional Council (WRC) and Isaac Regional Council (IRC) local government areas (refer to Figure 2.1).

The project area comprises the project's six mining lease application (MLA) areas (also referred to as the project tenement areas). The project tenement areas include MLA 10355, MLA 10356, MLA 10357, MLA 70434, MLA 70435 and MLA 70436. Collectively, the six MLAs cover an area of approximately 22 697 hectares (ha).

Key components of the project to be developed, as described in the EIS, include:

- **Eight open-cut pits:** seven pits located in the southern part of the project area (known as the southern phase commencing construction in year 1) and one pit located in the northern part of the project area (known as the northern phase commencing in year 15).
- **Out-of-pit waste rock dumps**.
- **Southern and northern coal handling and preparation plants (CHPPs)** including CHPP modules, product coal stockpiles, surge bin and crushing facilities and workshop facility.
- **Southern and northern mine infrastructure areas (MIAs)** including office and administration facilities, worker amenities, workshops, servicing facilities, wash-down facilities and storage for fuel and oil.
- **Southern and northern ROM coal stockpile area and ROM dump station** comprising dump hopper, product conveyor, crushers and surge bin.
- **Southern and northern train loading facilities (TLFs)** comprising train loading bin, a narrow gauge line rail spur with 300 metre (m) radius rail loop. The southern rail spur/ loop will be 7 km long and the northern rail spur/loop will be 3.5 km.
- **Conveyors** to connect product coal pads adjacent to the northern and southern CHPPs to the respective TLFs.
- **ROM coal haul roads** to connect open-cut pits to the northern and southern CHPPs and associated loading facilities for ROM coal.
- **Heavy vehicle and light vehicle crossings** required for the Newlands Rail System.
- **Light vehicle access roads** constructed in and around the two CHPPs and the MIA. Wherever possible, the proponent intends to separate the light vehicle traffic from heavy mining or earthmoving equipment roads.
- **A water management system** constructed to divert clean water, capture and manage mine area run-off and pit water for re-use or release subject to release criteria. Water storage infrastructure for mine-affected water and sediment control ponds for sediment-laden run-off including 6 clean water dams, 14 mine-affected water dams, 17 in-pit sumps and 27 sediment-affected water dams.
- **Co-disposal dams** situated adjacent to each CHPP for placement and water re-use of process water comprising both coal rejects and dewatered fines from the CHPPs.
- **Power lines and substations** for connection to an existing 66 kV power line that intersects the tenements adjacent to the Collinsville-Elphinstone Road. Additional lines will be installed above ground on steel or concrete poles and located within the mining lease boundaries in a corridor approximately 20 m wide.
- **Water pipelines** constructed within the project area to connect SunWater's Burdekin to Moranbah water supply pipeline system to raw water storage facilities adjacent to the northern and southern CHPPs.
- **A sewerage treatment plant** (STP) with bunded storage in the project area. Treated effluent will be re-used (for irrigation) with sludge material disposed of by a certified contractor at an appropriately licensed regional waste disposal facility.

- Provision for diesel storage, portable back-up power generators and storage for tyres and other materials.
- The project will utilise microwave technology for telecommunications and will not require connection to existing telecommunications infrastructure in the project area.

The project being assessed would require development only on the MLAs. The only off-tenement infrastructure that would be developed for the project is the accommodation facilities in Glenden which would be facilitated by another organisation and the subject of a separate approval process under the *Sustainable Planning Act 2009* (SP Act). I have not assessed the environmental impacts of the accommodation facilities in this report. However, I have assessed the social and economic impacts associated with accommodation in Glenden and transporting workers to and from Glenden.

The estimated area of disturbance as a result of the project's direct footprint from mining and infrastructure areas would be 6998 ha. Infrastructure, roads, dams, TLFs, pipelines and drainage diversions are estimated to have 907 ha of disturbance with the remaining 6091 ha caused by open pit mining operations and the waste rock dumps for the mine pits.

2.1 Development stages

The pre-construction stage involves detailed design, tendering and early procurement of infrastructure components. This stage will start approximately two years before the construction stage and does not involve on-site construction activities or require resource allocation approvals. Site preparation will start approximately 1.5 years before the construction stage focusing on the internal access road, southern MIA and CHPP and then be staged on an as-needed basis.

Construction of mine facilities is intended to commence immediately after the mining leases are granted. There will be two periods of construction for this project, the southern phase and the northern phase. Construction in the northern phase will commence in approximately Year 15 of the southern phase mining operations and will include the same site preparation activities as the southern phase.

Mining operation is to commence as soon as construction of the mine facilities has been completed. Mining will commence in the southern tenement area (West Pit 1), adjacent to initial infrastructure, to allow for the staged ramp-up of production to planned capacities. The sequential progress of the eight mine pits over the 50-year project life and the location of mine infrastructure is shown in Figure 2.2 of this report. Mining operations are proposed 7 days per week, 24 hours per day. The broad mining methodology for each open pit is described in Chapter 7 of the EIS.

The proponent intends to progressively rehabilitate the mine site throughout the operation and decommissioning stages of the mine. The decommissioning by the proponent of operational mine pits and infrastructure areas is proposed to be phased over the 50-year life of the mine project with the majority of decommissioning activities occurring in the mine closure phase for the last two years of the project's life. During post mine closure there will be continued monitoring of the groundwater in the four permanent mine voids.

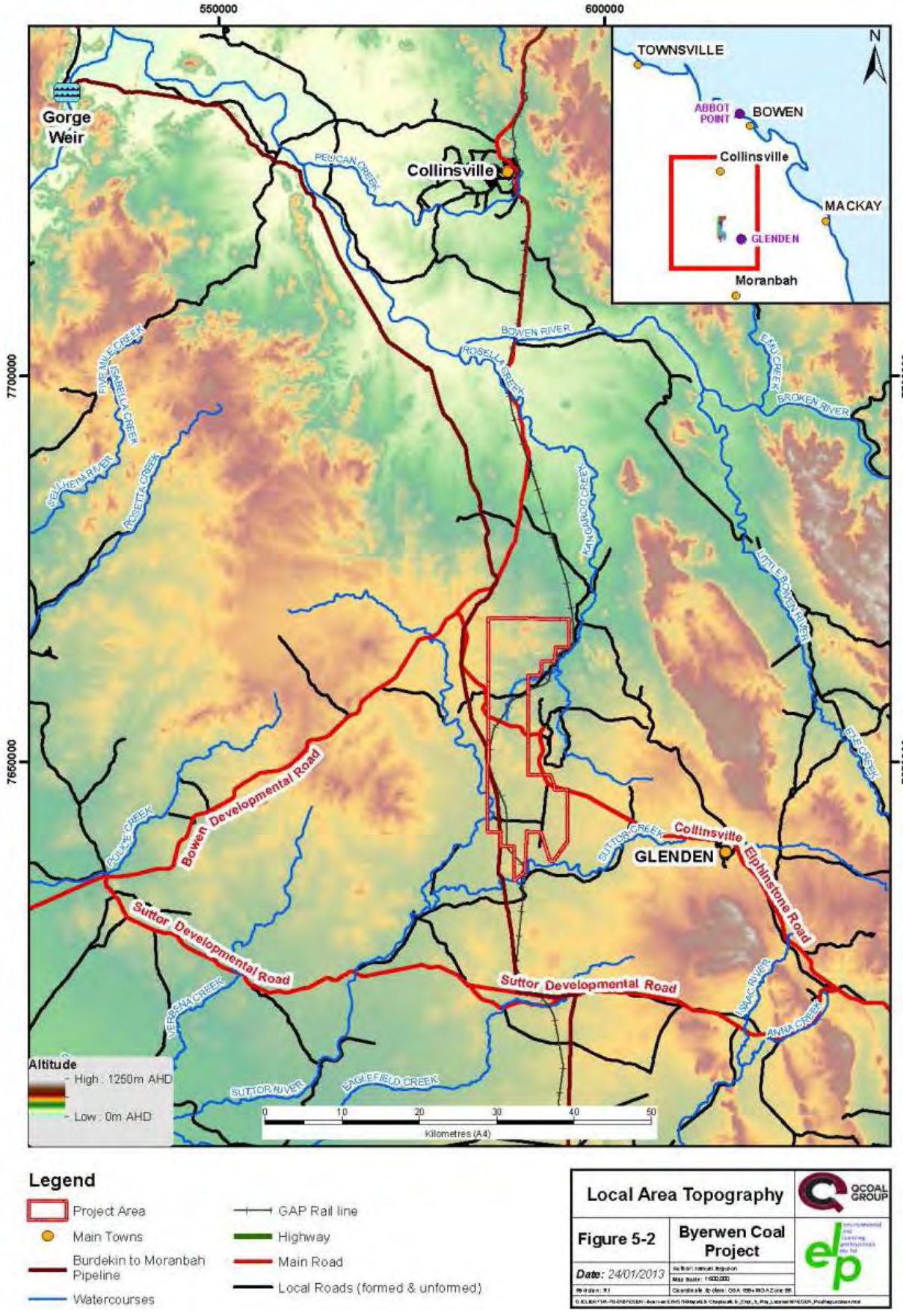


Figure 2.1 Regional location map

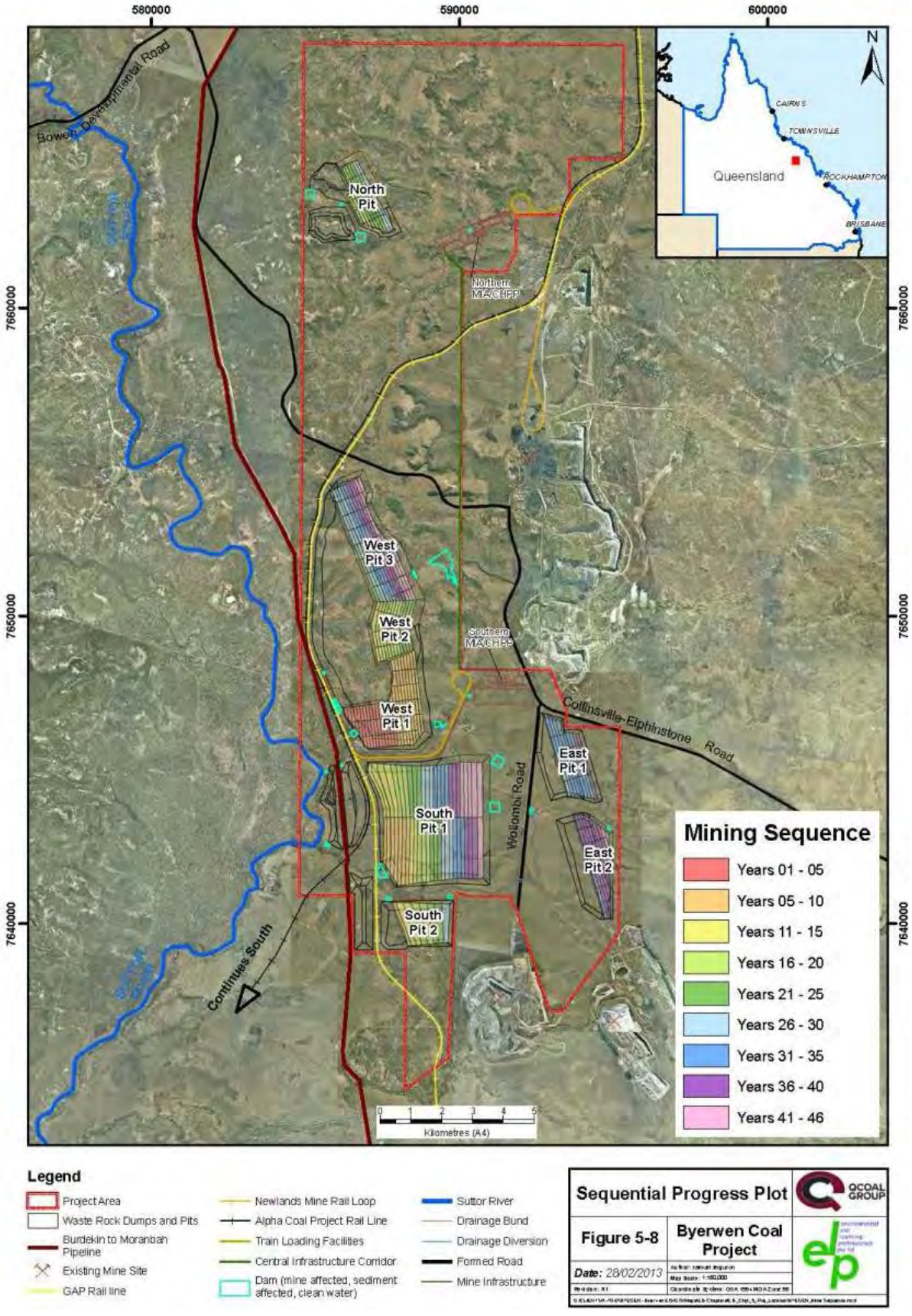


Figure 2.2 Sequential progress plot map

2.2 Dependencies and relationships with other projects

The project is dependent upon the ability of the proponent to acquire an allocation of water (4500 megalitres per annum (MLpa)) from externally sourced water over the 50-year life of mine and electricity supply (5 megawatt (MW) construction phase and 23 MW operational phase) (subject to separate approvals processes). These dependent projects are the:

- sourcing and delivery of water initially from SunWater's existing Burdekin to Moranbah water pipeline system that traverses the western side of the project area. The project will take water from SunWater's proposed Gorge Weir to Byerwen duplicate pipeline (to be built in the same easement as the existing Burdekin to Moranbah pipeline) when it becomes available
- connection to Powerlink's electricity transmission lines.

Proposed mining projects in the Galilee Basin are planning rail and infrastructure corridors that pass through or close to the project area. Hancock Coal's proposed Alpha Coal Project and Adani's proposed Carmichael Coal Project have planned rail corridors that bisect the project area partially following the alignment of the existing Newlands Rail System.

The Byerwen project is located immediately to the west of Xstrata Coal's Newlands and Wollombi/Suttor Creek mines, which produce in excess of 10 Mtpa of thermal coal. An existing haul road corridor from Wollombi/Suttor Creek to the Newlands processing area intersects the project area. There were 7 other major development projects within 15 km and 40 projects within 150 km of the project proposed in May 2012. If they proceed they will contribute to the regional impacts of the project in the Bowen Basin. Section 34.3 of the EIS contains the details of these projects.

3. Environmental impact statement assessment process

On 1 March 2011, the then Coordinator-General declared this project to be a 'coordinated project' under section 26(1)(a) of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act). This section details the steps in the project's EIS assessment process. For a detailed explanation of the EIS assessment process, refer to **www.dsdip.qld.gov.au/cg**

In undertaking this evaluation, I have considered the following:

- the proponent's initial advice statement (IAS)
- the proponent's EIS
- comments and issues raised in properly made submissions[2] from advisory agencies, non-government organisations and the public relating to the EIS.

[2] For a definition of a 'properly made submission', refer to the Glossary on page 161 of this report

- additional information in the form of an additional EIS (AEIS) and issues raised in submissions from advisory agencies relating to the AEIS
- revised reports and documentation from the proponent in response to agency submissions on the AEIS
- advice received from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Developments (IESC)
- advice received from the Commonwealth Department of the Environment (DE)

Table 3.1 shows the steps taken in the project's EIS assessment process.

Table 3.1 Overview of environmental impact statement assessment process

Date	Process
13 January 2011	A delegate of the Commonwealth Minister for the Environment determined project is a 'controlled action'
4 February 2011	Final initial advice statement and request for project declaration received from proponent
1 March 2011	Project declared a 'coordinated project' by Coordinator-General
9 April 2011	Submission period on draft TOR commenced
16 May 2011	Submission period on draft TOR closed
19 July 2011	TOR finalised and issued to proponent
22 May 2013	EIS provided by proponent to Coordinator-General for evaluation
8 June 2013	EIS released for public and agency comment by Coordinator-General
23 July 2013	Submission period on EIS closed
16 September 2013	Additional information requested from proponent by Coordinator-General
24 October 2013	The Commonwealth Minister for the Environment determined project is to be assessed under section 24D of EPBC Act
24 January 2014	AEIS provided to Coordinator-General for evaluation
29 January 2014	AEIS made available for advisory agency comment
25 February 2014	Submission period on AEIS closed

On 13 January 2011, a delegate of the then Commonwealth Minister for Sustainability, Environment, Water, Population and Communities, now the Commonwealth Minister for the Environment, determined that the project is a 'controlled action'[3] under the EPBC Act. The relevant controlling provisions under the EPBC Act at that time were:

- sections 18 and 18(a) listed threatened species and endangered community
- sections 20 and 20(a) migratory species.

On 24 October 2013, the Commonwealth Minister for the Environment determined that the project would trigger new controlling provisions (sections 24D and 24E: protection of water resources from coal seam gas development and large coal mining development) under item 23 of schedule 1 of the EPBC Amendment Act.

[3] For a definition of 'controlled action', refer to the Glossary on page 161 of this report.

Section 8 of this report, matters of national environmental significance (MNES)[4], lists each controlling provision under the EPBC Act and explains the extent to which the Queensland Government EIS process addresses the actual or likely impacts of the project on the matters covered by each provision. The Commonwealth Minister for the Environment will use the information in section 8 to assess the project and make a decision under the EPBC Act.

Eighteen submissions were received on the draft TOR for the EIS, comprising 11 from advisory agencies, 4 from non-government organisations and 3 from public submitters.

Twenty-two submissions on the EIS were received including a submission from DE, 12 from State government agencies, 2 from local governments (IRC and WRC), 5 from non-government organisations and 2 from private individuals. Copies of the submissions were forwarded to the proponent and the then Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), now DE.

On 16 September 2013, I requested that the proponent to submit additional information to address matters raised in submissions on the EIS. Specific issues requiring additional information included:

- groundwater, particularly connectivity with the alluvium and impacts of water drawdown
- water management and surface water quality impacts in the Suttor River and downstream
- justification on groundwater modelling methodology
- terrestrial and aquatic ecology
- regional impacts relating to groundwater, listed threatened species, four final mine voids and the local community.
- revised air quality material
- revised social impact material.

4. Project approvals

Approvals for the project must be provided by several local, state and Australian Government agencies, and I have not imposed conditions for these matters. The likely approvals or permits sought by the proponent directly from this Coordinator-General's evaluation report, together with approving agencies and associated legislation are listed in Table 4.1.

[4] For a definition of MNES, refer to the Glossary on page 161 of this report.

Table 4.1 Approvals and permits required for the project and conditioned in this report

Project component/ activity	Relevant approval	Legislation	Authority	Status
Whole of project	Controlled action	EPBC Act	DE	Commonwealth Minister's decision due within 30 days of receiving Coordinator-General's report
Mining and associated activities on the mining lease	Environmental Authority (EA) for a level 1 mining project	*Environmental Protection Act 1994* (EP Act)	Department of Environment and Heritage Protection (DEHP)	Draft EA conditions provided in Appendix 2 of this report, public notification processes to occur
Water course diversion work	Water permit/ riverine protection permit	*Water Act 2000* (Water Act)	Department of Natural Resources and Mines (DNRM)	Prior to commencement of watercourse diversionary work
Various permits/exemptions for interfering with protected plants and animals	Protected animals and plants and wildlife permits Damage mitigation permit	*Nature Conservation Act 1992* (NC Act)	DEHP	Prior to commencement of works interfering with protected plants and animals
Activities in strategic cropping land area	Validation assessment to confirm presence of strategic cropping land	*Regional Planning Interests Act 2014* (RPI Act)	DNRM and Department of State Development Infrastructure and Planning (DSDIP)	One validation assessment not complete Approval prior to the disturbance
Open/close government roads	Approval to upgrade and realign parts of Collinsville-Elphinstone road	*Transport Infrastructure Act 1994* (TI Act)	Department of Transport and Main Roads (DTMR)	Applications will be lodged after surveys of current road alignments are completed
Roadworks – State Controlled Roads (SCR)	Approval to undertake ancillary works to a SCR and encroachment permit	TI Act	DTMR	Prior to the commencement of ancillary or encroachment work
Application for permanent road closure of Wollombi Road	Approval to permanently close local road	*Land Act 1994* (Land Act)	DNRM	The road will need to be closed prior to disturbance
Application for permanent closure of stock route	Approval to permanently close underlying road reserve and stock route	Land Act	DNRM	Application to be advertised and approved prior to disturbance or closure

4.1 Local government approvals

The mine components of the project are predominantly located within the local government area (LGA) of IRC, excluding a section to the north of EPC1690, which is situated within the WRC LGA. The development of a mining activity for which an EA applies is exempt from assessment against a local government planning scheme under the SP Act. Therefore, there are no applicable local government approvals for the mining lease. The project has no off-site infrastructure being assessed under this process so I have not conditioned any future approvals granted by the IRC or WRC.

4.2 State government approvals

Mining lease

Before mining commences, the mining lease must be granted pursuant to the *Mineral Resources Act 1989* (MR Act). The mining lease is subsequent to the EA for mining activities pursuant to the EP Act.

Environmental authority

Mining activities on a mining tenement are environmentally relevant activities (ERAs) and environmental regulation is effected by way of an EA (mining activities) under the EP Act [5]. The proponent has advised that there are no ERAs for the project that fall outside of the EA and mining lease areas. The two proposed rail spurs are on the mining tenement, so environmental management of this component of the project will be dealt with under the EA conditions.

Under section 49 of the SDPWO Act, the Coordinator-General may state conditions for the draft EA (mining activities). I have stated conditions at Appendix 2 of this report for the draft EA (mining activities) for activities on the proposed mining lease for the Byerwen Coal project, as described in section 2 of this report.

An environmental management plan (EM Plan) is required under the EP Act for the EA for mining activities. There is one EM Plan for the project as all components of the project are subject to the EA.

The EM Plan (version 4) submitted by the proponent on 14 May 2014 amended and supersedes the EM Plans contained in the EIS and the AEIS. Section 7 of this report has an overview of the EM Plan and draft EA conditions that have been informed by the EM Plan.

[5] Section 3.3.3.2 of Chapter 3 and Section 1.6 of Appendix 9 of the EIS contained a list of ERAs as at May 2013. The list of ERAs changed following the reassessment of the list of ERAs requiring approval resulting from the *Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012*. The proponent provided the updated list of ERAs in Appendix 1 of the AEIS in January 2014. For a definition of ERA refer to the Glossary on page 161 .

Approvals in Galilee Basin State Development Area

The state government declared the Galilee Basin State Development Area (SDA) on 13 June 2014 under the SDPWO Act, comprising a rail alignment and infrastructure precinct which runs north south through the project area. The Coordinator-General will assess applications for development against the SDA's development scheme.

Other state approvals

Approvals under other state legislation may be required for project activities on the mining lease that are not related to the EA (mining lease) or development approval by local governments. For the project, these may include, but are not limited to:

- watercourse diversions—Water Act
- harvesting of water or interception of overland flow—Water Act
- closure or relocation of a road or stock route—Land Act
- interfering with animal breeding places—NC Act
- clearing of protected plants—NC Act
- roadworks for SCR—TI Act
- regional interests development approval for strategic cropping area—RPI Act.

4.3 Australian Government approvals

The EIS process has been undertaken in accordance with the requirements of the bilateral agreement between the Queensland and Australian governments relating to environmental assessment. Accordingly, subsequent to this report, authorisation for any controlled action will be considered by the Commonwealth Minister for the Environment for approval under section 133 of the EPBC Act once the minister has received this evaluation report prepared under section 35 of the SDPWO Act. The minister will use the information in section 8 of this report to make an informed decision whether or not to approve the controlled action under the EPBC Act, and if so, apply conditions to the approval necessary to limit the impact on MNES.

5. Environmental impacts

This section of the report evaluates the major environmental impacts identified in the EIS, AEIS additional project information, submissions on the EIS and comments from advisory agencies and other stakeholders.

I have considered the proponent's commitments (refer to Appendix 6 of this report) to avoid, minimise and manage the impacts of the project in reaching a conclusion on the acceptability or otherwise of the proposed impact of the project. I require all proponent commitments to be fully implemented by the proponent during the life of the project.

5.1 Land use and rehabilitation

5.1.1 Agricultural land use

There are seven leasehold grazing properties within or intersected by the project area that will be affected by the project. The project disturbance footprint covers an area of 6998 ha. About 68 per cent of this area has been cleared for grazing of beef cattle. There is one dwelling within the project area. It is owned by the proponent and will be vacated prior to any project construction and not impacted by the project.

Chapter 14 of the EIS provides details of the potential impacts of the project on the existing agricultural land uses. An agricultural land suitability assessment was undertaken by the proponent to identify agricultural land within the project area and determine how much agricultural land would be directly impacted by the project caused by the construction of mining infrastructure or open-cut coal mining pits (refer Chapter 14, Section 14.3.5 of the EIS).

The proponent's assessment found that there is approximately:

- 2666 ha of class A agricultural land within the project area and the project disturbance footprint will directly impact approximately 1638 ha
- 9540 ha of land suitable for beef cattle grazing within the project area and the project disturbance footprint will directly impact 4258 ha
- 2663 ha of land suitable for non-irrigated broad acre cropping within the project area and the project disturbance footprint will directly impact 1636 ha.

I note that the project is not within a Priority Agricultural Area (PAA) under the RPI Act.

The proponent's mitigation measure is to negotiate compensation agreements with landholders for impacts to agricultural activities within the project area. The proponent has also committed to negotiating with landholders about the ongoing use of land within the project area, that is not subject to disturbance by the mining activities, for existing land uses, such as grazing (Appendix 6, Commitment 433).

The proponent has identified grazing as one of the post-mine land use objectives in Table 9-9 of the EM Plan. Commitments have been made by the proponent with respect to the continued use of the land for grazing outside the project impact footprint, and to consider grazing as a land use post-mining in accordance with the principles of

the preferred rehabilitation hierarchy [6] described in DEHP's *Rehabilitation requirements for mining projects 2012.*

Broad rehabilitation strategies are outlined in the EIS and EM Plan. The proponent has committed to prepare a rehabilitation management plan and monitoring program within two years of the effective date of the EA, a mine closure plan four years prior to final coal processing on the mining lease and a post closure management plan 18 months prior to final coal processing (Appendix 6, commitments 108, 443 and 444). The proponent has also made a commitment to progressive rehabilitation during the life of the mine (Appendix 6, Commitment 26).

The EIS states that the final landscape rehabilitation plan will be designed to achieve a self-sustaining landform or have maintenance requirements consistent with a post-mining land use that will be agreed with landowners. Supporting mine infrastructure, such as roads and bridges will be removed post mining and rehabilitated to pre-mine land uses, unless an agreement is reached with the post-mine landowner regarding the ongoing use of the relevant infrastructure.

The required outcome is that the proponent will rehabilitate the site to a standard that will enable the reinstatement of the previous land use of cattle grazing or develop an alternative outcome with a higher economic value than the previous use. I acknowledge that the nature of the project means that there will be unavoidable impacts to agricultural land caused by open-cut pit mining activities over the 50-year mine life with a permanent impact to agricultural use resulting from the 1342 ha of un-rehabilitated voids post mine closure.

I am satisfied the mine decommissioning and rehabilitation proposal has been sufficiently outlined in the EIS. I have stated a condition for the rehabilitation completion criteria in Table BY1 in Appendix 2, Schedule H including soil rehabilitation criteria that ensures soil properties can support plant growth that is suitable for cattle grazing to manage the impact of the project on current land use.

5.1.2 Strategic cropping land use

When the project was declared a coordinated project, strategic cropping land (SCL) in Queensland was managed and protected under the *Strategic Cropping Land Act 2011* (SCL Act). The project area was within the 'strategic cropping management area' (SCMA) as mapped by the Queensland Government. The SCL Act was repealed on 13 June 2014 when the RPI Act was enacted. The RPI Act identifies and protects areas of regional interest including Strategic Cropping Areas (SCA), which are areas formally designated SCL. The SCL Act protection policies have been migrated into the RPI Act and land previously identified as SCL retains its protection through a SCA designation.

Under the transitional provisions in the RPI Act, if validation applications under the SCL Act had not been determined when the RPI Act came into force, the application must be decided under the repealed SCL Act. The proponent has committed (Commitment 423, Appendix 6) that if land is determined to be SCL, the appropriate process will be followed.

[6] Refer to Glossary on page 161

SCL is discussed and mapped in sections 14.3.7 and 14.6.2 of the EIS. A desktop assessment and preliminary site investigation undertaken for the EIS determined that there is 4128 ha of potential SCL within the project area and that the project disturbance footprint will directly impact 1430 ha of potential SCL. The proposed impact triggered a requirement under the SCL Act (in force at the time) for SCL validation applications to be submitted to DNRM to confirm SCL in the project disturbance footprint.

The proponent submitted validation applications for the properties that contain potential SCL in the project disturbance footprint. One validation application related to Suttor North Station (Lot 689 on SP251696) has been decided and recorded as non-SCL in the DNRM decision register. A SCL validation application for the remaining affected properties is yet to be decided by DNRM.

The mitigation measures for impacts to SCL that are available to the proponent include avoidance, payment into the SCL mitigation fund or entering into a mitigation deed to address the loss of productive capacity of mitigated SCL. My required outcome is that all impacted SCL is progressively rehabilitated by the proponent during the mine life and not permanently lost from production. If this is not achieved I am satisfied that the above mitigation measures will provide an acceptable outcome to avoid or compensate for the loss of SCL.

Based on my review and DNRM advice, I am satisfied the proponent has followed the necessary process under the SCL Act to validate land parcels as SCL or non-SCL and assessed the project impacts on SCL in accordance the SCL Act that was in force when the EIS and AEIS was prepared. The proponent is required to follow the appropriate processes for SCL under the transitional provisions of the RPI Act. The proponent is required to apply for a Regional Interest Development Approval for any impacts to a SCA and mitigate the impacts in accordance with the RPI Act. In conclusion, I have not set any conditions for any future approvals for SCAs under the transitional provisions of the RPI Act.

5.1.3 Local road land use and closure

Wollombi road is a local government road that runs north-south through the project area (refer Figure 5.1). It will be impacted by the project as ROM coal roads from East Pit 1 and East Pit 2 and a drainage diversion will intersect it and a dam will be constructed over part of the road in Year 3 of operations. The EIS stated that local roads may need to be temporarily or permanently closed as a result of the project but did not specify Wollombi Road for permanent closure. I requested additional information regarding specific road closures and the AEIS stated the intention to make an application under section 99(1) of the Land Act to permanently close Wollombi Road.

The AEIS noted that Wollombi Road has very low levels of public use. It provides access to two properties, Wollombi Station and Suttor North Station. The proponent has consulted with the two affected landowners, the Director of QCoal and Leichhardt Pastoral Pty Ltd—a subsidiary of Byerwen Coal Pty Ltd. The landowners support the road closure. The proponent confirmed that there are no existing access easements or applications over the affected properties that would be affected by the closure. The

proponent has committed to consult further with IRC about the proposed closure of Wollombi Road (Appendix 6, commitments 395 and 396) prior to making application under the Land Act.

I am satisfied that Wollombi Road can be closed without causing significant impacts given the low levels of public use, the agreement reached with the two affected landowners, alternative property access arrangements and the proponent's commitment to consult further with IRC. I have not recommended any conditions for a future approval by DNRM and IRC for this road closure.

5.1.4 Stock route land use and closure

There is a 7 km stock route (number 405ISSA) that traverses generally east to west across the project area (see Figure 5.2) before merging in the project area into stock route (number 403WHIT) that traverses in a north to south direction to the west of the project area . The stock routes merge on the western bank of the Suttor River inside and close to the western boundary of the project area.

Stock route (405ISAA) will be severed from the stock route network by the project mining pit. The proponent has stated that it will make an application for permanent closure of the underlying road reserve and stock route (405ISAA) under section 99(1) of the Land Act, which would permanently change the land use.

Current DNRM policy is that the stock route network is to be retained to ensure the future connectivity of the network regardless of current usage.

Stock route (403WHIT) will be unaffected by the project. Access to the Suttor River from 403WHIT will also remain unaffected. This access is important for cattle watering. A nearby stock route (325ISAA) and 403WHIT converge to the south of the Byerwen site. I consider that 325ISAA is an acceptable alternative route around the project that will ensure an outcome of no breaks in the stock route network.

The proponent has been consulting with IRC and DNRM (Commitment 399 and 436) regarding the closure of the east–west stock route (405ISAA) and related impacts.

Given the importance of protecting the connectivity of the stock route network in the region, I have recommended a condition (see Appendix 3, Schedule 1, Recommendation 1) that stock route 403WHIT be maintained and remains open in the project area, including the existing access to the Suttor River, to ensure stock movement or access to the Suttor River is not impacted. I am satisfied that with the proponent's commitments to consult with DNRM and IRC and with my recommendation to maintain stock route 403WHIT, potential impacts related to closing the stock route 405ISAA will be appropriately mitigated.

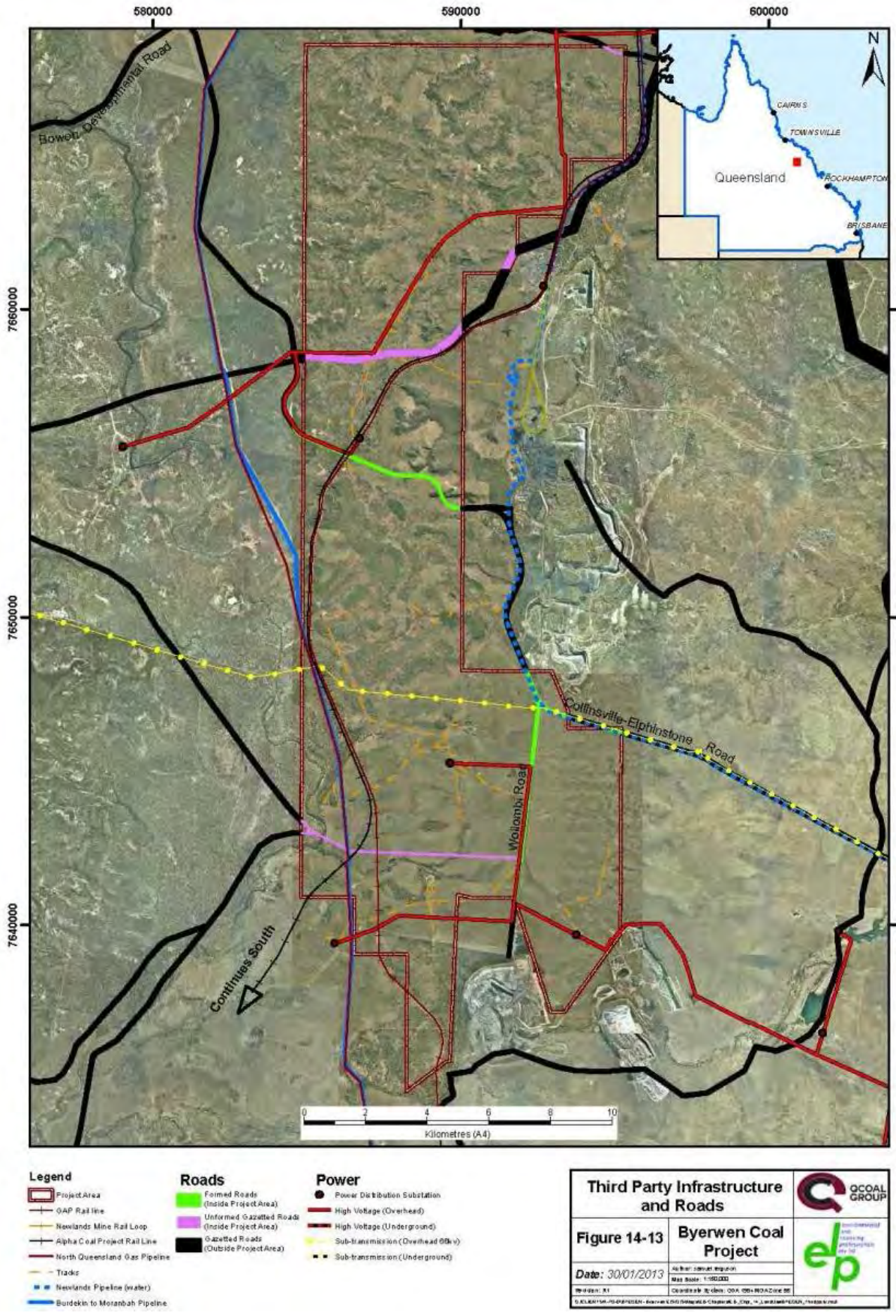


Figure 5.1 Non-project infrastructure and roads

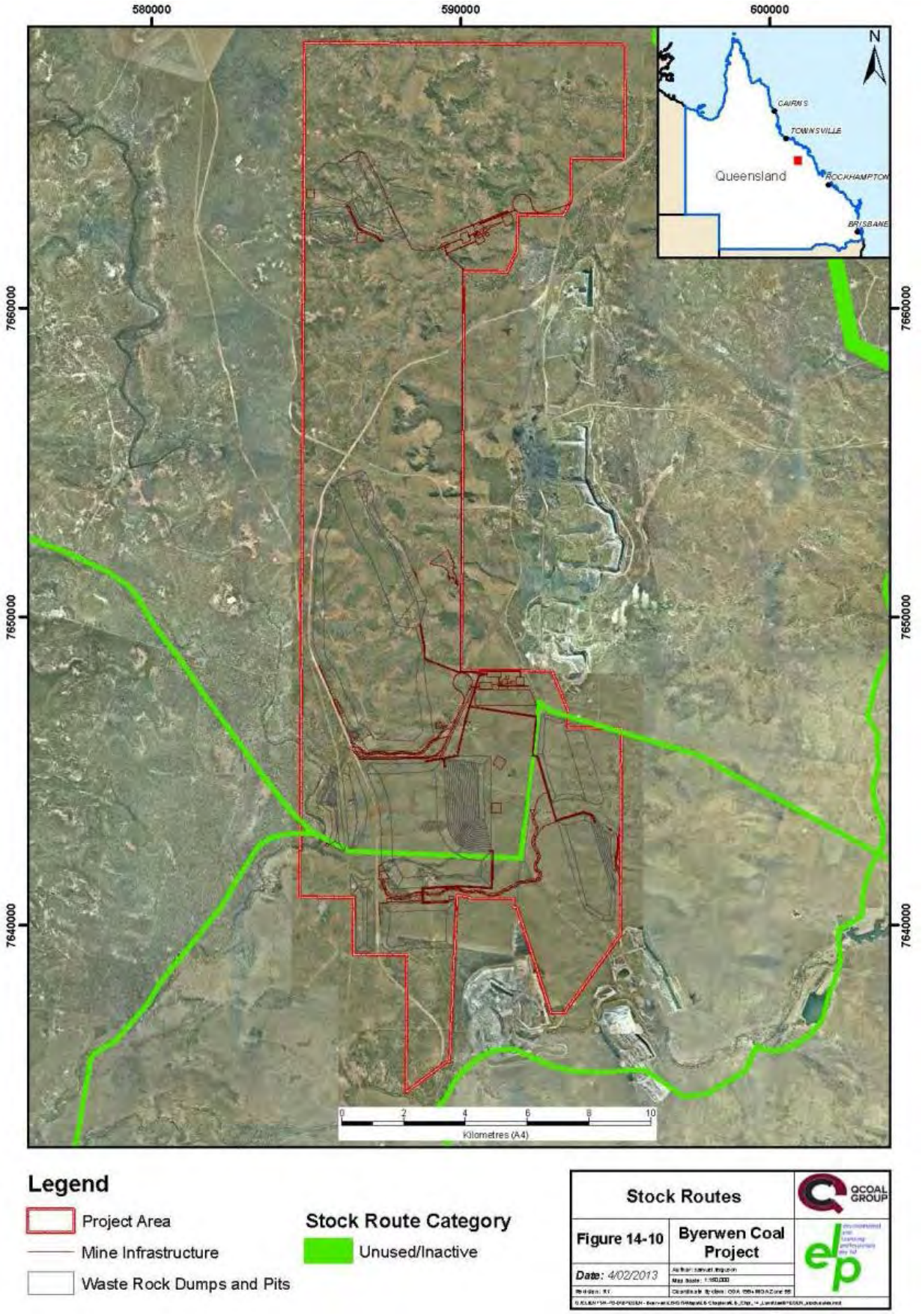


Figure 5.2 Stock routes

5.1.5 Non project infrastructure land use

Another land use in the project area is infrastructure corridors including Aurizon's Newlands Rail System (previously known as the Goonyella to Abbot Point rail line or northern missing link), SunWater's Burdekin to Moranbah water pipeline, the Newlands water pipeline, Ergon power lines and the North Queensland gas pipeline, as can be seen in Figure 5.1.

The project has the potential to impact on this infrastructure within the project area. Waste rock dumps are proposed to be located adjacent to the railway line and pipelines, and several haul road routes are proposed to cross over this infrastructure. Chapter 7 of the EIS contains maps (Figures 7-4 to 7-12) that show the progressive placement of waste rock dumps beside this infrastructure in year 1, 3, 5,10, 16, 25 and 50 of the project.

Chapters 14 and 32 of the EIS present an assessment of potential impacts and risks to the rail and water pipelines infrastructure and outline proposed mitigation measures. The proponent has committed to prepare a rehabilitation management plan within two years of the effective date of the EA to manage risks, such as waste rock dump wall failure, during and following rehabilitation (Appendix 6, Commitment 72). The rehabilitation management plan is detailed in Section 9 of the EM Plan. SunWater requested that a crossing agreement be entered into prior to mining lease issuance. The proponent has made a commitment (Commitment 409) to consult with the operators of all infrastructure and apply for crossing agreements that will contain conditions related to construction and operation of the crossing.

The proponent has committed to consult with owners of infrastructure which traverses the site to ensure impacts are appropriately mitigated and I am satisfied these impacts can be addressed in the detailed design phase and that agreements are not required prior to the issuing of a mining lease to achieve an acceptable outcome.

5.1.6 Open-cut mine pit voids

The project has eight open-cut mining pits. While four out of eight mining pits will be backfilled, four mining pits will be only partially backfilled leaving open voids in the landscape up to 350 m deep covering a total area of approximately 1342 ha. The proponent's final void assessment report (AEIS, Appendix 9) noted that pit lakes will form in the final voids as a result of groundwater inflows, direct rainfall, seepage from waste rock dumps and surface water from walls surrounding the pit. All pit lake areas will slowly increase in depth and area over several hundred years until a steady state condition is reached where water losses are equivalent to water inputs.

The final void report anticipates that the water level in the pits will remain below the ground level so that water will not flow over the top, even under the modelled 'worst-case' high-emission climate change scenario with increased rainfall. The modelled base-case scenario shows the mean steady state water level for the south pit is estimated to be 65 m deep, or 235 m below ground level, and it could take up to 390 years post mine closure to reach that steady state condition. The peak water level may be higher than this at times, however it is likely to be well below adjacent ground level.

The voids will remain as deep holes in the ground with steep sides between 45 and 65 degrees. Water level in the voids is predicted to be at a depth where people and livestock would not be able to safely access it. Access to the voids will need to be restricted by bunding, fencing and signage and the proponent has committed to this (Appendix 6, Commitment 112).

Flood modelling showed that even under a probable maximum flood (PMF) the pits will not be affected by floodwaters. The voids will also be protected from ingress of overland flow that may otherwise result in overtopping of the voids. It is highly unlikely that the brackish water in the four voids will be discharged to the surrounding environment through overtopping of the bunded walls. The EIS concluded that there will be no impacts on the region's surface water and surface water users downstream from the final voids given no water will be discharged by overtopping.

The proponent has a commitment in the EM Plan to prepare a final void investigation and residual void water quality management study (both to be reviewed every five years), and implement a mine closure management plan to minimise impacts on post mine closure land use.

While I acknowledge the proponent's justification for not backfilling all eight mine pits, the economic benefit of backfilling voids is that it would allow for the construction of post-mining landforms that provide a beneficial land use for the longer term. For example, the land could be returned to cattle grazing or another higher order use. This would ensure a good long-term economic outcome rather than a void that has no future economic, social or environmental benefits.

There are no statutory requirements or policy guidelines in Queensland that require backfilling. With the implementation of the EM Plan and conditions, this project must meet the goals set out in DEHP's current mine rehabilitation guidelines. The final voids do represent a lower value land use than the pre-mining use and present a number of environmental and safety risks that require ongoing monitoring and management. The proponent made the following commitments into the EM Plan in relation to the long-term management of the voids:

- a final void investigation that includes a study of options to minimise the area and volume of the voids after mining ceases and to establish viable beneficial future uses of the voids (refer section 9.5.2.1 of the EM Plan)
- a residual void water quality management study, including a monitoring program (refer section 9.5.2.1 of the EM Plan)
- a post-closure management plan, which is to be implemented for a nominal period of at least 30 years or a shorter period if the site is stable and no release of contaminants will result in environmental harm (refer section 9.8.4 of the EM Plan).

I have stated conditions related to the voids that are to be attached to the draft EA, requiring the proponent to undertake measures in the early stages of pit lake establishment to stabilise voids. These measures and rehabilitation completion criteria are listed in Table BY1 Appendix 2. They include promoting biological activity and ecological development and to ensure the voids are protected from flooding, given the potential serious consequences if flooding does occur. I have stated a condition that residual voids must not cause any serious environmental harm to land, surface waters

or any recognised groundwater aquifer (Appendix 2, Schedule H, Condition H14). I have also conditioned the proponent to take all reasonable and practical measures to minimise the size of the void remaining after mining activities cease to maximise the beneficial use of the land (Appendix 2, Schedule H, Condition H15).

The proponent is also required to provide financial assurance to the Queensland Government for the decommissioning and rehabilitation costs as per Section 292 of the EP Act. I have stated this as Condition A7 in the draft EA conditions in Appendix 2, Schedule A. The financial assurance will only be returned to the proponent once the government has determined that decommissioning and rehabilitation has been successful. The proponent will be required to provide a final rehabilitation report that includes information about ongoing environmental management, monitoring requirements and residual risks.

Based on the EM Plan for the project, the proponent commitments, financial assurance and the requirements of my stated conditions and recommended conditions, I am satisfied that land disturbance impacts would be appropriately managed throughout the project life and post-mining operations and mine closure.

I consider there is a need to understand the best environmental, economic and social outcomes achievable with regards to mine pit management and the long-term implications of creating pit lakes and permanent residual voids in the Bowen Basin. I consider it is appropriate for DEHP or DNRM as lead agency to undertake investigations into the consequences of establishing a deep linear void trending parallel to many subsurface structural lineaments, including faults, across the entire Bowen Basin. Initially the research should determine the current location, number, area and depth of both operational mine pits and residual voids post mine closure as this information is not currently available for analysis. An approach to pit management and backfilling of future mine proposals could then be developed based on the known combined voids in the Bowen Basin and their economic impact on land use.

5.2 Terrestrial and aquatic ecology

This section of the report evaluates terrestrial and aquatic ecology focusing on ecological values of state significance that may be affected by the project. For further discussion on MNES affected by the project, refer to section 8 of this report.

The project is situated within the Brigalow Belt North Bioregion in the Burdekin River catchment and the elevation on the site ranges approximately from 250 m to 390 m Australian Height Datum (AHD).

The project's disturbance footprint covers an area of 6998 ha. About 32 per cent of the disturbance footprint contains remnant vegetation of which 33 per cent is classified as 'endangered' or 'of concern' regional ecosystems (REs).

Approximately 2391 ha of remnant native vegetation will be subject to clearing associated with the establishment of open-cut pits and project infrastructure. This clearing will lead to a reduction of 779.1 ha of threatened vegetation communities within the project disturbance footprint and impact on environmental values. The extent of the project's disturbance footprint is shown in Figure 5.3 as 'Project ecological footprint'.

Methodology

The proponent's study methodology incorporated a desktop assessment and field surveys. The EIS stated that a number of databases and literature searches were undertaken in March 2012 incorporating both Australian and Queensland Government publications. These were supplemented by site investigations undertaken during both the dry and wet seasons between 2009 and 2012 to allow for seasonal variations.

Three terrestrial flora field surveys were conducted across a total of 143 sites in the project area. The flora field surveys used the Queensland Herbarium's methodologies.[7]

Three separate terrestrial fauna field surveys involved fauna trapping at 13 sites and secondary habitat assessments at 22 sites, which were undertaken in line with approved permits (Figures 18-1 and 18-2, Chapter 18 of the EIS).

Ten representative sites were selected for the aquatic ecology surveys (Figure 19-1, Chapter 19 of the EIS). Field surveys were conducted in May 2012 (a 'late wet season' survey) and December 2012 (an 'early wet season' survey) to account for seasonal variation.

The findings for the late wet season survey were presented in Chapter 19 of the EIS. The findings for the early wet season survey were not available at the time the EIS was submitted. In response to my request for additional information the results of the early wet season survey were presented in Appendix 2 to the AEIS—Aquatic Ecology Impact Assessment Addendum Report. The report includes the results of a full re-assessment of the aquatic ecology values and potential impacts to aquatic ecology which were undertaken following the early wet season survey.

[7] Nelder et al, Queensland Herbarium, (Environmental Protection Agency), *Methodology for the Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland.Version 3.1.* Environmental Protection Agency 2005.

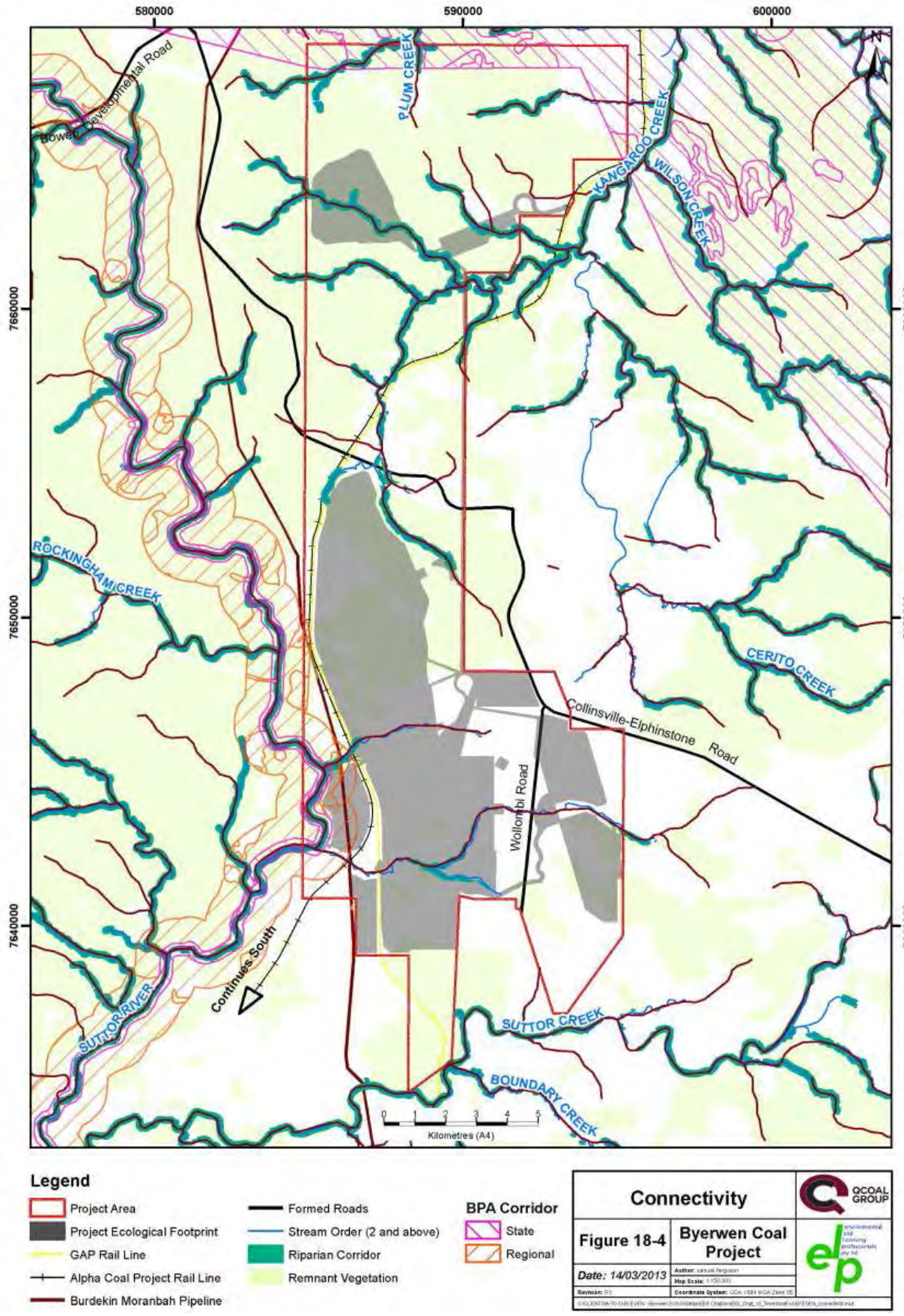


Figure 5.3 The project disturbance footprint

5.2.1 Terrestrial flora and fauna

Terrestrial flora

A total of 436 terrestrial flora species were recorded in the project area including two flora species that are listed as threatened under the NC Act. As can be seen in Table 5.1, desktop assessments identified a further six threatened flora species under the NC Act that either have the potential to occur or are unlikely to occur in the project area. A previously undescribed flora species *Kelita uncinella* was identified during the surveys. The species has not been assessed by any scientific committee and has no legislative status to date.

Table 5.1 Threatened flora species within project area

Species	Nature Conservation Act Status	Occurrence
Bertya pedicellata	Near Threatened	Known to occur
Cerbera dumicola	Near Threatened	Known to occur
King bluegrass *(Dichanthium queenslandicum)*	Vulnerable	May occur
Croton magneticus	Near Threatened	May occur
Eucalyptus raveretiana	Vulnerable	May occur
Finger panic grass *(Digitaria porrecta)*	Near Threatened	May occur
Cajanus mareebensis	Endangered	Unlikely to occur
Cycas ophiolitica	Endangered	Unlikely to occur

The field survey also identified five regionally significant species classified as non-threatened flora species within and adjacent to the project area. Additionally, a number of flora species recorded during the field survey are recognised as species of cultural, commercial or recreational significance.

Under the *Vegetation Management Act 1999* (VM Act), the proponent proposed revised RE mapping in the EIS based on the findings of its field surveys. I have used the proponent's revised mapping for my evaluation of impacts. The proponent's revised mapping indicates 23 REs in the project area. Table 5.2 illustrates the 14 REs that are either 'endangered' REs or 'of concern' REs (biodiversity status). Endangered REs represent 1457 ha of the project area and of-concern REs comprise 1766 ha of the project area.

Table 5.2 Threatened regional ecosystems within project area

RE classification	Description (DEHP, 2012d)	Vegetation Management Act status	Biodiversity status	Area (ha)	Project Disturbance footprint area (ha)
11.3.1	*Acacia harpophylla and/or Casuarina cristata* open forest on alluvial plains	Endangered	Endangered	118	8.7
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of Concern	Of Concern	78	1.6

RE classification	Description (DEHP, 2012d)	Vegetation Management Act status	Biodiversity status	Area (ha)	Project Disturbance footprint area (ha)
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains	Of Concern	Of Concern	223	0
11.3.25	*Eucalyptus tereticornis* or *Eucalyptus camaldulensis* woodland fringing drainage lines	Least Concern	Of Concern	157	8.7
11.3.27	Freshwater wetlands/ Lacustrine wetland (e.g. lake)/Palustrine wetland (e.g. vegetated swamp)/ *Eucalyptus coolabah* and/or *E. tereticornis* open woodland to woodland fringing swamps	Least Concern	Of Concern	20	0
11.4.2	*Eucalyptus* spp. and/or *Corymbia* spp. grassy or shrubby woodland on Cainozoic clay plains	Of Concern	Of Concern	566	156.4
11.4.8	*Eucalyptus cambageana* woodland to open-forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Endangered	Endangered	155	34.6
11.4.9	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains	Endangered	Endangered	237	62.2
11.5.16	*Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains/remnant surfaces	Endangered	Endangered	581	190.4
11.7.1	*Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or E. microcarpa woodland on lower scarp slopes on Cainozoic lateritic duricrust	Least Concern	Of Concern	71	214.1
(11.7.1×1)	Semi-evergreen vine thicket	Least Concern	Of Concern	534	0
11.8.11	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Of Concern	Of Concern	117	84.4
11.8.13	Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks	Endangered	Endangered	345	18.0
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	21	0
Total (ha)				**3223**	**779.1**

High value regrowth (HVR) mapping for the project area indicates that 68 ha of endangered HVR vegetation is present, predominantly with advanced Brigalow regrowth status. Three threatened ecological communities (TECs) have been confirmed as occurring on site. Discussion of Brigalow, Semi-evergreen vine thicket and Natural grasslands TECs are further considered in the section 8.4.3 of this report.

During field surveys 56 introduced flora species were identified as present within the project area. Of these species four were listed as Weeds of National Significance (*Cryptostegia grandiflora, Opuntia stricta, Opuntia tomentose and Parthenium hysterophorus*), and six are declared as Class 2 Pests under the *Land Protection (Pest and Stock Route Management) Act 2002*.

The regionally significant weed Noogoora burr (*Xanthium pungens*) listed under the WRC Pest Management Plan 2009 was identified during site visits. Buffel grass and other common environmental weed species were encountered on site. The AEIS incorporated the priority weed species listed by IRC and WRC into the study to prevent the potential entry and spread of Council listed species. The proponent has committed to implement a weed and pest management plan, which includes measures to manage declared and environmental weeds and pest animals (Appendix 6, commitments 181 and 182).

Terrestrial fauna

Fauna field investigations were undertaken through a range of survey techniques. I am satisfied that the level of survey effort conducted is sufficient. A total of 222 terrestrial vertebrate fauna species were present at the site, including 15 species of amphibians, 34 species of reptiles, 148 species of birds and 25 species of mammals (including 17 bat species).

Under the Nature Conservation (Wildlife) Regulation 2006 six fauna species fall within the ‘known to occur’ category and a further three species are considered ‘likely to occur’ in the project area as shown in Table 5.3. Two likely individuals of Black-throated finch were observed, and as such are to be considered as ‘likely to occur’ in accordance with the precautionary approach. The Black-throated finch is discussed further in Chapter 8 of this report.

In addition, two species of bioregional significance which are considered to be near threatened in accordance with the International Union for Conservation of Nature (IUNC) Guidelines were recorded. The Grey-crowned babbler (eastern) (*Pomatostomus temporalis temporalis*) and the Australian bustard (*Ardeotis australis*) were recorded during all fauna surveys within a wide range of habitat types. A Short-beaked echidna (*Tachyglossus aculeatus*) was discovered. It is classified as a ‘special least concern animal’ under section 34 of the regulation. This classification requires that the special cultural significance of the animal and the need to conserve existing populations is to be taken into regard when managing impacts.

Table 5.3 Threatened fauna species within project area

Species	Nature Conservation Act Status	Occurrence
Ornamental snake *(Denisonia maculate)*	Vulnerable	Known to occur
Cotton pygmy-goose *(Nettapus coramandelianus)*	Near Threatened	Known to occur
Black-necked stork *(Ephippiorhynchus asiaticus)*	Near Threatened	Known to occur
Square-tailed kite *(Lophoictinia isura)*	Near Threatened	Known to occur
Squatter pigeon *(Geophaps scripta scripta)*	Vulnerable	Known to occur
Little pied bat (*Chalinolobus picatus*)	Near Threatened	Known to occur
Black-throated finch (southern) *(poephila cincta cincta)*	Endangered	Likely to occur
Common death adder *(acanthophis antarcticus)*	Near Threatened	Likely to occur
Australian painted snipe *(rostraula australis)*	Vulnerable	Likely to occur

Project impact on terrestrial flora and vegetation communities

A total of 2391.1 ha of remnant native vegetation will be cleared progressively in a staged approach during the life of the proposed mine. This vegetation clearing in the project disturbance footprint will result in the reduction of 779.1 ha of threatened REs, including 313.9 ha classified as 'endangered' REs and 465.2 ha classified as 'of concern' REs (refer Table 5.2). The majority (1612.8 ha) of the remnant vegetation to be cleared is categorised as 'not of concern' (biodiversity status).

As a result of the predicted loss of the vegetation, the following potential direct impacts were identified by the proponent:

- loss of vegetation communities or individual threatened species
- reduced species abundance and biodiversity
- loss of habitat, loss of connectivity and associated diminished fauna movement
- loss of land stabilisation and riparian filtration functions.

Remnant vegetation on the project site has linkages to identified state-significant biodiversity corridors which are important for fauna movement. Impacts for fauna species include direct impacts, such as removal of essential habitat and indirect impacts, such as those attributed to site operation activities. For example, the project has the potential to increase mortality of ground dwelling fauna through increased road strike by project related traffic, particularly along the project haul roads. Likely disturbed key habitats are gilgai habitats in the south, large parcels of contiguous remnant vegetation in the northern and central parts of the project, permanent water sources associated with farm dams, and riparian corridors associated with the Suttor River and Kangaroo Creek.

The outcome required is avoidance of significant vegetation communities by project activities to achieve minimisation of habitat loss, protection of riparian areas and maintenance of connectivity for fauna movement to ensure species abundance and retention of biodiversity.

Mitigation measures for terrestrial flora and vegetation communities

To mitigate these potential impacts the proponent has committed to a number of management measures to protect ecology, including progressive rehabilitation of the project area, to be carried out during the life of the mine (Appendix 6, commitments 170–219). Vehicle movements around known habitat areas of threatened fauna will be minimised, particularly at night, to reduce the risk of vehicle strike and the disruption to fauna associated with lighting (Appendix 6, commitments 187,188 and 194).

An offset strategy has also been developed by the proponent to compensate for residual impacts on threatened species (see Chapter 8 of this report). Other management measures have been outlined by the proponent in its EM Plan to minimise the impacts on, and provide protection to, the identified threatened and other potentially occurring flora and fauna species. The performance criteria for the management measures include:

- compliance with the requirements of the project's EA
- compliance with the rehabilitation management plan (refer Section 9, EM Plan)
- compliance with the Receiving Environment Monitoring Program (refer Section 6.6.1, EM Plan)
- compliance with the requirements of the water management system, including release criteria for mine-affected and sediment-affected water (refer Section 6, EM Plan)
- implementation of the weed and pest management plan (refer Section 12.5, EM Plan)
- flora and fauna managed in accordance with the requirements of permits and species plans
- no unplanned or unapproved disturbance or clearing of flora and fauna
- successful creation of offsets in accordance with success criteria in the offsets strategy.

I have recommended a condition (Appendix 3, Schedule 2, Recommendation 2) to mitigate impacts on endangered, vulnerable and near-threatened fauna listed under the NC Act for species that are known or likely to occur in the project area.

The proponent has identified residual impacts on endangered and of-concern vegetation communities in the project area which cannot be avoided, minimised or mitigated. It proposed the implementation of a biodiversity offset strategy to address these significant residual impacts (refer Chapter 21 of the EIS for the proponent's biodiversity offset strategy and biodiversity offset package). The proponent's proposed offset strategy has been prepared in line with the EPBC Act Environmental Offsets Policy (EOP), October 2012 and is discussed further in section 8.4 of this report.

The proponent revised the assessment of impact area in response to my request for additional information and provided an updated table in the AEIS showing State and Commonwealth values impacted by the project for use in the biodiversity offset package.

I have relied on Table 12-35 of the AEIS for areas of REs and the proponent's revised tables and information on the extent of REs to make recommendations to the

Commonwealth for conditioning under the EOP. Details of this offset are discussed in section 8.4 of this report.

On 13 June 2014 the Queensland Herbarium's assessment report of the proponent's application for revised RE mapping containing the amended certified RE mapping was provided to the proponent for review. The results of the Herbarium's amended mapping may be used by the proponent for the future determination of offset requirements by the Commonwealth Minister for the Environment.

The proponent's assessment showed that the majority of state significant biodiversity values (SSBV) are already covered by the EPBC Act EOP. An area of 0.4 ha of endangered regrowth RE 11.8.13 is not covered by the Commonwealth's policy but is recognised as SSBV under the *Queensland Biodiversity Offset Policy 2011* (QBOP).

For coordinated projects, the Coordinator-General has the powers necessary to state offsets as part of the broad conditioning powers under the SDPWO Act. I will determine and approve any State offset conditions that are considered necessary over and above Australian Government requirements. I will not require any additional offsets for impacts to SSBV if the Australian Government also requires an offset for the same values.

I acknowledge that the mitigation and management measures outlined by the proponent minimise risks to SSBV. Where significant residual impacts remain, I may require the values to be offset. I have imposed a condition (Appendix 1, Condition 1) that requires the proponent to prepare and submit for approval a biodiversity offset strategy (based on the biodiversity offset package) following the Commonwealth Minister for the Environment's decision on the project. The strategy must include any new information relevant to the State values offset determination obtained since the AEIS was received in particular the Queensland Herbarium's amended RE mapping. I will review and approve a final biodiversity offset strategy that includes my State values offset determination. I have stated conditions (H16 and H17) as part of Schedule H of the draft EA (Appendix 2) that will ensure the approved strategy is developed, submitted and implemented.

I do not expect the proponent to deliver up-front offset requirements related to potential impacts for the life of the project. Rather, the offset relevant to each component's area of disturbance would be provided prior to impacting on the SSBV by commencement of activities for that component. I require the revision of the project's offset requirements should the pre-clearance flora and fauna surveys detect the presence of additional threatened species or communities in the project area.

I acknowledge that the proponent has made a substantial number of commitments to protect ecology and I require the proponent to implement the commitments at the appropriate time. I have also recommended a condition that will reduce the impact to threatened species under the NC Act that are known or likely to occur in the project area (Appendix 3, Schedule 2, Recommendation 2).

I am satisfied that the proponent's commitments to minimise impacts on terrestrial flora values in the project area together with an offset for the residual impact on SSBV after avoidance, and mitigation measures will be adequate to address the land clearance

and habitat loss associated with the construction of open-cut pits and supporting mine infrastructure.

5.2.2 Aquatic flora and fauna

Aquatic ecology was addressed in detail in the EIS in Chapter 19 and Appendix 2 to the AEIS—Aquatic Ecology Impact Assessment Addendum Report. A description of the catchments, key waterways and wetlands potentially affected by the project, and a description of the project impacts on surface water is provided in section 8.6.3 of this report. Stygofauna was addressed in Chapter 20 of the EIS and project impacts on groundwater are addressed in section 8.6.2 of this report.

The aquatic flora and fauna field surveys highlighted the ephemeral nature of the project area. The late wet season (May 2012) survey was conducted six weeks after a flood event in the area and found surface water in all ten survey sites. However, at the time of the early wet season (December 2006) survey only two of the surveyed sites contained surface water; one was the riverine wetland and the other a lacustrine wetland (classified as a permanent dam). Other survey findings are discussed below.

Ten fish species were collected during the surveys. The studies found seasonal variability in fish communities with eight species collected during the late wet season survey and only five species collected during the early wet season survey. One fish species, the purple-spotted gudgeon, listed as priority species under the Aquatic Conservation Assessment (ACA) for riverine and non-riverine wetlands of the Great Barrier Reef Catchment was recorded in the project area. The species of was recorded in the Suttor River and a tributary of the Suttor to the west of the proposed site of South Pit 1 and in the palustrine wetland located west of West Pit 1.

It was found exclusively during the late wet season, while the tilapia and sleepy cod, both noxious species, were found exclusively during the early wet season. All species are considered tolerant of variable and occasionally poor water quality.

Although early wet season sampling was limited compared to the late wet season (due to the number of wet survey sites) aquatic macroinvertebrate communities remained relatively stable between the late and early season surveys. A combined total of 61 taxa were retrieved from both surveys, with 57 and 31 taxa collected during the late and early wet season respectively. No MNES, endangered, vulnerable or near threatened (EVNT) or priority taxa were recorded during either survey.

Only one aquatic vertebrate was detected from a distance during the surveys; an unidentified turtle in the lacustrine wetland in the early wet season survey.

A total of 19 macrophyte (aquatic plant) species were recorded during the early and late season surveys. There was an overall decline in species diversity between the late and early wet season surveys primarily caused by most of the survey sites being dry during the early wet season. Three species, the Water chestnut, Swamp ricegrass and Nardoo, listed as priority species under the ACA, were recorded in the palustrine wetland during the late wet season survey. No priority species were recorded during the early wet season survey. Only one aquatic weed, Awnless barnyard grass (*Echinochloa colona*), was detected during field surveys, however it is not a listed or declared weed species.

Water quality

Water quality was measured as part of the field surveys. Water quality displayed seasonal variability. Some parameters, including electrical conductivity and turbidity, exceeded relevant guidelines. In terms of the overall aquatic ecosystem values of the project area, the EIS concluded they are slightly to moderately disturbed, primarily as a consequence of cattle grazing. The AEIS summarised that the aquatic species recorded are considered tolerant of wet/dry periods as well as variable and occasionally poor water quality.

I have stated a range of conditions related to surface water quality and quantity that will reduce the impact on aquatic ecology (see conditions F1–F28 in Appendix 2, Schedule F). Condition F21 specifically relates to restoring the ecosystem functionality of the palustrine wetland.

Impacts on aquatic flora and fauna

The project will directly and indirectly impact on aquatic ecology values in the project area and potentially downstream resulting from loss of wetland habitat and modification and degradation of aquatic habitat.

Key potential impacts on aquatic ecology caused by the project include:

- construction of project stream crossings for vehicles at 16 locations resulting in loss of aquatic ecosystems
- reduced water catchment area for the palustrine wetland
- removal and diversion of 36 km of waterways
- risk of introducing aquatic weed species
- proposed relocation of aquatic fauna during construction
- releases of mine-affected water into the aquatic ecology altering water quality
- removal of dams resulting in loss of aquatic species
- vegetation clearing, earthmoving and stormwater runoff resulting in water quality impacts in aquatic ecosystems.

Control strategies were identified by the proponent in the EIS and EM Plan to manage and address each of these impacts. The proponent's management measures and commitments to deal with these impacts are listed in Appendix 6 of this report and discussed below.

Vehicle stream crossings

The proposed 16 vehicle stream crossings would negatively impact on aquatic ecology. Proposed crossings within a watercourse as defined in the Water Act need to be carried out in accordance with the DNRM Guideline *Activities in a watercourse, lake or spring associated with a resource activity or mining operations.*[8] The proponent has confirmed that the crossings within a defined watercourse will be designed in accordance with the guideline or where the guideline cannot be met, the proponent will

[8] Department of Natural Resources and Mines, *Activities in a watercourse, lake or spring associated with a resource activity or mining operations(version 3),* Department of Natural Resources and Mines, Brisbane, 2012.

contact DNRM to discuss design requirements. Furthermore, proponent Commitment 210 (Appendix 6) provides that stream crossings will be designed to maintain or enhance water flows, quality, stream ecology and existing vegetation.

Reduced catchment for the palustrine wetland

The aquatic ecology of the palustrine wetland could be impacted if the wetland dries up due to the 43 per cent reduction in the wetland's catchment area caused by the project's mining activities (discussed further in in section 8.6.3 of this report). The proponent noted that at the time of the late wet season surveys, the wetland covered an area of approximately 60 ha with an average depth of 0.5 m. During the early wet season survey the wetland was largely dry.

The AEIS stated that species observed to inhabit the wetland can generally tolerate fluctuating wet/dry conditions, and that the reduction in catchment area is unlikely to alter aquatic diversity but may lower abundance as the extent and frequency of inundation is reduced. The proponent has stated that a representative suite of plants should persist and enable a return to pre-development ecology once the original catchment is reinstated provided a core area of wetland remains seasonally inundated.

In addition to water level monitoring during periods of inundation, the proponent has committed to monitor wetland ecology bi-annually as part of the REMP, so that any changes in species abundance and the wetland ecosystem functionality can be monitored and mitigation measures undertaken if necessary (Appendix 6, commitments 404 and 405).

Rehabilitation criteria and indicators for the wetland were specified by the proponent to measure whether rehabilitation is successful once the original catchment is reinstated. The required outcome is that the aquatic ecology of the wetland return to the pre-development ecology post year 16 and prior to the end of mining operations. For this to be achieved I require the proponent to undertake its commitments for monitoring and mitigation measures. I have also stated a condition requiring that land disturbed by mining be rehabilitated in accordance with the rehabilitation criteria and indicators (Condition H1 and Table BY1 'Rehabilitation Completion Criteria' in Appendix 2).

Waterway diversions

Changes to the ecological functioning of waterways and possible loss of biodiversity could result from construction of waterway diversions. The proponent has made a commitment (Appendix 6, Commitment 198) to construct diversion channels and dewater impacted waterways during the dry season where possible, when streams support the lowest diversity and abundance of aquatic species. In addition to required permits and licences under the Water Act, the diversions may also trigger the requirement for permits or authorisations under the NC Act. Any disturbance to breeding places would need to be undertaken in accordance with a damage mitigation permit under the NC Act. The requirement for permits or authorisations under the NC Act will be confirmed by the proponent during detailed design and prior to construction works.

The proponent has committed to monitor the physical and biological condition of diversions (Appendix 6, Commitment 202) and has prepared rehabilitation criteria that

aim to ensure vegetation is re-established and fauna can safely return to the waterways. The EIS stated that macrophyte communities are expected to quickly colonise the constructed diversions. Macroinvertebrate species are expected to colonise the diversions via adult migration once water flows.

I recognise the habitat importance of the diversions and have stated Condition H1 for the draft EA requiring the proponent to rehabilitate drainage lines and waterway diversions in accordance with the rehabilitation criteria in Table BY1 in Appendix 2 of this report.

Aquatic weeds

There is a risk of imported aquatic weeds being introduced to the area by the project. Aquatic weeds, including water hyacinth (*Eichhornia crassipes*) and salvinia (*Salvinia molesta*) could be introduced via vehicles, machinery and material movement to the site. I consider that this impact is avoidable and require an outcome of no increase in aquatic weed species introduced by the project. I note that the proponent has stated commitments (Appendix 6, commitments 27, 99, 100 and 181) in relation to weed management and section 12 of the EM Plan contains a range of weed management control strategies including wash down facilities for vehicles, inspection of material and fill imported to the site and worker/contractor education. I am satisfied with the proponent's commitments and the EM Plan in relation to weed management to avoid aquatic weeds being introduced to the area by the project.

Aquatic fauna relocation

The EIS proposed relocation of fauna (fish and turtles) found prior to and during construction and operation. To monitor the impacts and success of relocating fauna, particularly turtles, I have recommended a condition (Appendix 3, Schedule 2, Recommendation 3) that the proponent engages a suitably qualified and experienced person to locate suitable habitat for relocation, to optimise post-release survival, and develop a post release monitoring program where appropriate. In addition, I note that the relocation of fish would be undertaken in accordance with a fisheries permit under the *Fisheries Act 1994* and turtles would be relocated in accordance with a species management program or damage mitigation permit required under the NC Act.

With the implementation of the conditions I have stated in Appendix 2, the proponent commitments in Appendix 6 and the EM Plan (control strategies, monitoring, mitigation and rehabilitation measures), I am satisfied the impacts of the project to aquatic ecology can be reduced to an acceptable level.

Stygofauna

The EIS and AEIS state that the only groundwater-dependent ecosystem (GDE) that is present in the project area is stygofauna (fauna living in groundwater systems). The stygofauna survey methodology involved a pilot study of one sampling event in the 2011 pre-wet season during which eight bores were sampled on the project site. The stygofauna dataset collated for the Xstrata Newlands Coal Mine was also used to inform the assessment for the project. The project site and Newlands Mine share the same hydrogeology with connected aquifers that allow movement of stygofauna

between the aquifers. The Newlands Mine sampled 20 bores annually from 2008 to 2011.

In terms of stygofauna, two animals representing two different species, one Amphipoda order and one Copepoda order, were identified on the project site during the pilot study survey and both were retrieved from one of the eight bores.

The Newlands Mine bore samples found 53 animals of the Syncarida order and 11 from the Oligochateta order. Both species were collected from one bore (out of 20) in 2011. The same bores were sampled annually from 2008 to 2010, however no stygofauna were recorded during these events. The combined datasets of the project site and Newlands Mine included 75 individual samples collected from 28 bores from 2008 to 2011. The EIS concluded that this dataset represents a low diversity and abundance from the locality.

The project TOR required stygofauna sampling to be conducted in accordance with the best practice guidelines prepared by the Western Australian Environmental Protection Authority (EPA)—*Guidance for the assessment of environmental factors No.54* and *Guidance for the assessment of environmental factors No.54a.*[9]

The proponent carried out one round of sampling. Seven out of eight bores sampled were less than six months old. The Western Australian (WA) EPA guidelines state that sampling of bores less than six months old must be conducted over two seasons. The proponent has committed to undertake an additional round of sampling which will bring the study into accord with the guidelines (Appendix 6, Commitment 398). The sampling will be undertaken prior to commencement of groundwater dewatering activities and after a preceding wet season.

The project has the potential to impact on stygofauna if the aquifer environment is altered. This can occur through a change in water quality or rapid water drawdown and will occur when operations in the open-cut mining pits reach below groundwater level.

The EIS and AEIS concluded that while the aquifer environment will be removed by open-cut mining, impacts on the species would not be significant enough to warrant avoiding the impact because the order/family of the stygofauna collected is found in all Australian states. It concluded that any proposed mining activities associated with the project will not threaten the survival at the order/family level and as such, the proponent did not propose any mitigation for potential impacts to stygofauna.

Although the EIS states that impact to stygofauna is not significant, consideration of impacts for stygofauna and determination of mitigation strategies is dependent upon the completion of the second round of sampling for stygofauna and meeting the WA EPA guidelines. In addition to the proponent's commitment, I have stated a condition for the draft EA in Appendix 2, Schedule E, Condition E8 that adequate assessment of impacts is undertaken to determine species significance. The results of this sample are to be provided to DEHP and DNRM for assessment of the impacts and determination

[9] Environmental Protection Authority, Western Australia, *Consideration of Subterranean Fauna in Groundwater and Caves during Environmental Impact Assessment in Western Australia No.54,* Environmental Protection Authority, 2003. Environmental Protection Authority, Western Australia, *Guidance for the Assessment of Environmental Factors Sampling Methods and Considerations Subterranean Fauna in Western Australia No.54aTechnical Appendix to Guidance Statement No.54* Environmental Protection Authority, 2007.

as to whether an EA amendment application is needed to include control strategies should a significant species of stygofauna be present in groundwater sampled under the mine pits locations.

In response to my request for additional information on groundwater systems, the proponent installed a groundwater monitoring bore adjacent to the palustrine wetland to determine the relationship between the palustrine wetland and shallow groundwater as discussed in section 8.6.3 of this report. I have conditioned the monitoring of this bore in the draft EA in Appendix 2, Schedule E, Condition E3. Further discussion of GDE is found in section 8.6.2 of this report.

5.3 Waste

5.3.1 General waste

A variety of non-mineral waste streams will be generated by the project throughout the construction and operation phases over the 50-year mine life. Volume 2, Chapter 26 of the EIS identified the following non-mineral waste streams as likely to be produced by the project:

- regulated waste including hydrocarbon waste (waste hydrocarbon fluids, oils (350 tonnes per annum (tpa)) and greases (<50 tonnes), oil from oily water (90 tpa), oil and fuel filters, oily rags (25 000 litres per annum), air filters and batteries (150 tpa), tyres (200 tyres per annum), grease trap waste, sewage sludge and residuals (20 million litres)
- paints and resins, chemicals and herbicides (<10 tpa)
- scrap metal (100 tpa), and other building and construction waste
- general waste including putrescible wastes (<170 tpa during construction) and other general wastes primarily generated from warehousing, workshop, office and crib room facilities
- recyclable waste including paper, cardboard, recyclable plastics, glass, and aluminium (<150 tpa), steel cans, concrete (<10 tonnes), timber (<3 tonnes)
- excess spoil from construction of TLFs (excluding topsoil) (<1 000 000 m^3)
- vegetation (7600 ha) , sediment and sediment-affected water (volume dependent on seasonality, rainfall and year of mine) and process water.

Table 26-3 and Table 26-4 of Chapter 26 of the EIS identify the waste type, source, volume, disposal method and proposed control methods. The disposal method identified have been determined to achieve the highest possible level on the waste management hierarchy with regard to the principals in the Environmental Protection (Waste Management) Policy 2000.

I requested further detail from the proponent about on-site and off-site landfills, nitrification of upper river catchments from sewage waste water, recycling strategies and economic models with respect to the economic, environmental, social and cultural outcomes for the project in relation to waste. Further information was provided by the proponent in section 10 of the AEIS to confirm that on-site landfill is not proposed for

the project. Waste will be removed either via a licensed waste contactor or disposed of at the Glenden Waste Facility.

I also requested the proponent review the capacity of the Glenden Waste Facility to handle the proposed additional waste quantities. In section 10 of the AEIS, the proponent confirmed its intention to consult with other waste facility operators within the locality should the Glenden Waste Facility reach capacity (Appendix 6, Commitment 410).

The proponent has committed to developing and monitoring a waste management plan for the project (Appendix 6, commitments 248, 249 and 250) and intends to maintain a register of all regulated wastes (Commitment 258) on site with auditing and monitoring proposed to ensure potential impacts are managed (Commitment 259). Licensed contractors are proposed to be engaged to remove regulated wastes from the site.

The proponent has conducted a comprehensive analysis of both the type and volume of general wastes for the project. The EIS proposes management strategies in accordance with the waste management hierarchy for general wastes and commits to a mine waste management plan.

I have stated conditions for the draft EA with regard to burning of waste (Appendix 2, conditions C1 and C2) and rehabilitation objectives for handling and disposal of general, industrial and regulated waste (Appendix 2, conditions H1 and H2).

I am confident that potential impacts from general waste generated by the project can be adequately managed through the commitments made by the proponent (Appendix 6) and the conditions I have stated in Appendix 2.

5.3.2 Mine waste

The open-cut mining process will involve stripping of topsoil and waste rock. Approximately 18 million m^3 of top soil and sub soils and 5300 million bank cubic metres (Mbcm) or 210 Mtpa of waste rock will be removed over the life of the project. Volume 1, Chapter 9 of the EIS presented an analysis and characterisation of waste rock and coal rejects anticipated for the project, and disposal methods proposed to avoid and minimise environmental impacts.

A geochemical assessment of waste rock (238 samples) and coal rejects (41 samples) was undertaken for the project. Table 9-2 of the EIS summarises the geochemical testing conducted for both waste rock and rejects.

Sampling and analysis of waste rock and coal rejects for the project generally indicates:

- there is a low risk of acidity forming for waste rock or coal rejects
- there is a moderate to high risk of salinity and dispersion from weathered material where exposed to the final landform. Where unweathered material covers this, the risk is lower
- concentrations of metals and metalloids are low.

The proponent proposes two methods of mine waste management. Top soil will be stockpiled for re-use in rehabilitation of waste rock dumps over the life of the mine.

Waste rock will initially be stockpiled out of pit, adjacent to the coal mining areas within the project area, as the boxcuts are developed. Approximately three years after the pit commences operation, progressive backfilling of the pits with waste rock is proposed. Waste rock backfilling is proposed for four of the eight pits. The other four pits will remain as final voids, with remaining waste rock located outside of pits, contributing to the final landform.

The proponent commits to develop a mine waste management plan to characterise and classify waste rock and to guide the placement of waste rock and coal rejects within waste rock dumps (Appendix 6, Commitment 64). In addition to the commitments, I have stated conditions for the draft EA for the management of waste rock (Appendix 2, conditions H6 and H7).

Process waste (fine and mid-size rejects) from the CHPPs will be disposed of initially in co-disposal dams (proposed at the northern and southern CHPPs) and subsequently into in-pit cells. I have stated a condition for the draft EA for tailings disposal management in Appendix 2, Condition C3.

The proponent has committed to constructing co-disposal dams in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures and any other relevant codes and guidelines.* The proponent also provided additional information that confirmed the co-disposal dams will be designed by a Registered Professional Engineer of Queensland and will be based on a “turkey’s nest” configuration, with no external catchment delivering water to the dams. Design of the co-disposal dams will involve site-specific geotechnical and hydraulic investigations. Design parameters for the co-disposal dams have been included in the EM Plan for the project. In addition to the commitments made by the proponent, I have stated a number of conditions for the draft EA with regards to dam structures in Appendix 2, conditions J1–J32.

The proponent has conducted a comprehensive analysis of the type, volume and characterisation of waste rock and coal rejects expected for the project. The EIS proposes management strategies and commits to a mine waste management plan for the waste rock and coal.

I am confident that potential impacts from mine wastes from the project can be adequately managed through the commitments made by the proponent (Appendix 6) and the conditions I have stated in Appendix 2.

5.4 Air quality

The proponent has identified eight sensitive receptors (station homesteads) located within the vicinity of the project as potentially affected by adverse air quality conditions resulting from project activities. Chapter 22, Table 22-1 of the EIS provides the location, occupancy status and the distance of the receptors relative to the project area boundary, project disturbance footprint and the TLFs. The closest receptor to the project disturbance footprint is located 7 km south-east and is occupied on an occasional basis. The closest receptor to the TLFs is 5.5 km south-west.

Potential dust impacts on air quality have been modelled for the operational phase of the project using The Air Pollution Model (TAPM). The impacts are predicted to be greater than those experienced for the construction and decommissioning phases and therefore represent worst-case scenario modelling.

Three modelling scenarios were addressed in the EIS for years 5, 27 and 35 of operations, representing years when maximum dust emissions are expected to occur. Year 5 was modelled with both standard and enhanced dust controls, and years 27 and 35 with enhanced dust controls. Results are presented in tables 22-5 to 22-8 and figures 22-3 to 22-17 of the EIS, including predicted concentrations for particle matter (PM) $PM_{2.5}$ (24-hour maximum and annual average), PM_{10} (24-hour, 5^{th} highest), PM_{10} (24-hour), total suspended particles (TSP) (annual average), and dust deposition (maximum month).

I requested clarification from the proponent on modelling inputs, parameters, inclusion of all air emission sources, justifications for adequacy of control methods (watering), cumulative impacts and ongoing monitoring. Adequate clarification and justification was provided by the proponent within the additional information to the EIS and within the EM Plan.

Modelling has demonstrated compliance with all air quality objectives identified in Volume 2, Chapter 22, Section 22.3 of the EIS with the exception of a single sensitive receptor (R5, homestead) for PM_{10} (24hours), during adverse meteorological conditions. I require the outcome that compliance with all air quality objectives be achieved at all sensitive receptors. I note that this can be achieved with the addition of operational and direct dust control measures proposed by the proponent in conjunction with standard and enhanced watering measures to supress dust caused by project activities.

The EM Plan addresses dust impacts of the project—specifically dust from haul roads. The proponent proposes through the EM Plan to increase dust suppression effectiveness by enhanced dust watering controls in conjunction with chemical suppressants to manage impacts.

The proponent has committed to install dust deposition gauges at all sensitive receptors (Appendix 6, Commitment 221) with monitoring as required to begin prior to mining operations and continuing for the life of the mine. The proponent has also committed to collect meteorological data from a monitoring station located on the site. More frequent monitoring is proposed at the sensitive receptor (R5, homestead) with a monitoring station permanently installed close to the homestead (Commitment 222). The monitoring station will assist with identifying weather events that lead to high dust scenarios, allowing pre-emptive implementation of dust control measures where required to ensure air quality objectives can be met at all sensitive receptors.

The proponent has committed (Appendix 6, Commitment 223) to develop and implement a dust management plan. The EM Plan for the project confirms the proponent will develop a dust management plan for the project, including an action response plan to mitigate adverse air quality impacts. The proponent advises the dust management plan will guide the sequential and incremental implementation of mitigation measures in response to adverse meteorological conditions, seasonal

effects and monitored dust levels to achieve compliance for all sensitive receptors with air quality objectives. The dust management plan will broadly cover sampling practices, location of sampling, frequency of sampling and meteorological data collection. Auditing is proposed within the EM Plan to assess the effectiveness of controls.

Air quality impacts from gaseous emissions such as carbon dioxide, oxides of nitrogen and sulphur dioxide were considered as part of the assessment. The EIS reported these pollutants as having low levels of emissions which are inherently widely dispersed, resulting in a very localised impact. The EIS concluded that the likelihood of emissions from gaseous pollutants exceeding emissions objectives beyond the boundary of the project area is minimal.

In addition to the commitments made by the proponent and the actions proposed within the EM Plan, I have stated conditions for the draft EA in Appendix 2 (conditions B1–B2) relating to air quality. I am confident that the development of a dust management plan, in conjunction with proponent commitments and the conditions I have stated in Appendix 2 will ensure air quality impacts for the project are adequately managed and air quality objectives are met at all sensitive receptors, including R5.

5.5 Greenhouse gas emissions

The proponent assessed the greenhouse gas (GHG) emissions of the project. The proponent is required to report on GHG emissions under the provisions of the *National Greenhouse and Energy Reporting Act 2007* (Cwlth) (NGER Act). The NGER Act prescribes an accounting methodology and requires the publication of results.

Under the NGER Act, boundaries have been established to assist in determining emissions attributable to a project. In terms of emissions boundaries, three scopes have been identified:

- **Direct (or point-source) emission factors** give the kilograms of carbon dioxide equivalent (CO2-e) emitted per unit of activity at the point of emission release (i.e. fuel use, energy use, manufacturing process activity, mining activity, on-site waste disposal, etc.).These factors are used to calculate **scope 1 emissions.**
- **Indirect emission factors** are used to calculate **scope 2 emissions** from the generation of the electricity purchased and consumed by an organisation as kilograms of CO2-e per unit of electricity consumed.
- **Indirect emission factors** are used to calculate **scope 3 emissions** that are all other indirect emissions that are not included in Scope 2. They are a consequence of the activities of the facility, but occur at sources or facilities not owned or controlled by the entity. Scope 3 emissions are not defined in the NGER Act because reporting them is not mandatory.

In accordance with the NGER Act accounting methodology framework and the TOR for the project, the proponent did not include Scope 3 emissions in the assessment of GHG emissions. This includes GHG emissions from transporting or processing the coal once it leaves the mine site.

Pursuant to the provisions of the *Energy Efficiency Opportunities Act 2006* (Cwlth) (EEO Act), the proponent is required to identify, evaluate and publicly report

cost-effective energy saving opportunities as the project is anticipated to use over 0.5 petajoules of energy per annum. The EEO Act comes under the jurisdiction of the Australian Government Department of Industry.

Scope 1 GHG emissions will be generated as a result of a number of project activities, such as the consumption of diesel by the mining fleet, methane emissions from coal, blasting and clearing of vegetation. The principal source of scope 2 GHG emissions will be purchased electricity from the electricity transmission network.

A GHG assessment was provided in Volume 2, Section 23 and Appendix 23 of the EIS for the project. The EIS reported that the project's maximum annual GHG emissions are approximately 568 kilotonne CO_2-e which will equate to approximately 0.1 per cent of the national GHG inventory for 2012. GHG emissions will be generated as a result of the following project activities:

- electricity consumption imported from the Queensland electricity grid (Scope 2)
- diesel fuel consumption from construction and operation of the mine (Scope 1)
- explosives combustion for blasting operations (Scope 1)
- fugitive emissions associated with coal seam methane release during coal mining operations (Scope 1)
- vegetation clearance (Scope 1).

Electricity imported from the grid and fugitive emissions will be the largest contributors to GHG emissions for the life of the project (approximately 44 per cent each), followed by fuel consumption (approximately 9 per cent).

The EM Plan states that the proponent is committed to sustainable development and reducing the GHG emissions of its operations, accelerating the uptake of energy efficiency, integrating GHG issues into business decision making and providing more consistent reporting of GHG emissions. The EM Plan outlines the proponent's relevant environmental protection objectives for the project as:

- minimise impacts from GHG arising as a result of project activities, by minimising the emission of GHG from project sources
- procurement of energy efficient equipment and plant where practicable
- effective mine planning and optimisation of schedules and routes
- management and continuous improvement toward GHG reduction.

The proponent commitment register in Appendix 6 of this report (commitments 226–228) provides for various control strategies relating to energy consumption and efficiency to minimise GHG to be implemented where practicable. The strategies include:

- an energy efficiency audit will be undertaken, where appropriate, during the detailed design phase
- the use of high-efficiency electrical motors throughout the mine site and the use of variable-speed drive pumps with high-efficiency linings at the CHPPs
- investigate the use of natural gas as a fuel alternative to diesel for mining equipment
- select fuel efficient motors

- install light sensitive switches on lighting equipment and energy efficient light bulbs throughout the project site
- install energy saving devices within the on-site buildings
- haul truck scheduling, routing and idling times will be optimised to minimise the amount of diesel consumed
- pit access ramps will be designed to limit the amount of effort required for fully-laden trucks to climb
- haul roads will be compacted to reduce rolling distance
- the location of ROM coal pads and waste rock dumps will be optimised during detailed design to limit the amount of distance haul trucks need to cover whilst heavily laden
- a mining method will be adopted that uses large equipment and economies of scale to significantly reduce GHG emissions
- coal and waste rock will be extracted and transported efficiently thereby minimising the number of trips and fuel consumption
- blasting will be designed to be efficient
- refrigerants in equipment and air conditioning will be recycled
- waste will be segregated into recycling materials and general waste
- vegetation will not be burned
- energy efficiency awareness training will be part of worker inductions.

GHG will be measured annually. The proponent is committed to monitor, audit and report on GHG emissions in accordance with the requirements of the NGER Act. The proponent is also committed to conduct periodic energy audits to include:

- benchmarking studies to allow mine performance relative to industry standards for energy use and where the mine is not achieving these standards, implement programs to achieve reductions. The results of audits will be used to identify means for continual reductions in GHG emissions
- an inventory of emissions and GHG sinks will be developed and maintained
- new technologies, with the potential to reduce emissions and energy use, will be reviewed over the life of the project (Appendix 6, Commitment 228).

I am satisfied that the GHG emissions assessments provided in the EIS and AEIS adequately quantify Scope 1 and 2 GHG impacts resulting from the project. Consideration of Scope 3 emissions is not a requirement of either Australian Government or state government legislation or policy. I note that the TOR for the EIS does not require Scope 3 emissions to be included in the proponent's assessment of GHG emissions.

I am satisfied that the control strategies provided in the EM Plan and the proponent commitment register will minimise GHG emissions and provide for the effective management of potential climate change impacts.

5.6 Noise and vibration

5.6.1 Noise

The project will create noise and vibration and could cause impacts on sensitive receptors.

Volume 2, Chapter 24 of the EIS identifies a total of eight sensitive receptors as potentially impacted by noise from the project. Table 24-2 of the EIS provides detail on the receptor location in relation to the project area, project disturbance footprint and TLFs. Noise impacts to worker accommodation are not included as part of the scope of the assessment. The worker accommodation location is yet to be selected and is likely to be located off-lease in Glenden.

Ambient noise monitoring was conducted at four locations surrounding the project site, during the day, evening and night time periods. The existing background noise level at sensitive receptors is considered low, with industrial and commercial noise not featuring prominently.

A detailed digital terrain noise model was developed for the project site and surroundings which considers ground, ground cover, tree zones, mounds, barriers and weather conditions. Modelling was carried out for a variety of operating scenarios in years 5, 17 and 36. It is expected that noise generated from the operational phase will exceed that of the construction and decommissioning phases and as a result modelling is based on the operational phase only. The methodology assumes worst-case scenario. Tabulated results are shown in Volume 2, Chapter 24, tables 24-8 to 24-10 of the EIS. Modelling results show that acoustic quality objectives, including those for low-frequency noise, are met during the day, evening and night at all sensitive receptors. My required outcome is that unacceptable noise impacts are avoided and conditioned noise criteria are achieved.

The proponent's EM Plan confirms that auditing will be undertaken to assess the effectiveness of the control strategies in meeting the noise criteria outlined and that where required, a noise monitoring program will be established and subsequent investigations undertaken should noise complaints be received.

I have stated conditions for the draft EA to cover noise generally (day, evening and night time), blasting noise limits (daytime and evening/night/early morning), low frequency noise, noise monitoring and recording (Appendix 2, conditions D1–D5).

5.6.2 Vibration

The project activities will include blasting which will result in vibration. A number of receptors have the potential to be impacted by vibration, including nearby homesteads and their occupants, historical cultural heritage sites and non-proponent infrastructure including Newlands Rail System (previously Goonyella to Abbot Point rail line), the proposed Alpha Coal project rail line, SunWater's Burdekin to Moranbah Pipeline and North Queensland Gas Pipeline. Vibration impacts to worker accommodation are not included as part of the scope of the assessment. The worker accommodation location is yet to be selected and is likely to be located off-lease in Glenden.

Modelling was carried out to determine the extent of impact based on a 5, 17 and 36 year mining scenario. Volume 2, Chapter 24, Figures 24-8 to 24-13 of the EIS mapped results for both vibration levels and peak sound pressures.

The EIS indicated that blasting vibration and overpressure goals set by the proponent are met for all sensitive receptors, homesteads, buildings and infrastructure. The outcome I require is that the project, with the application of appropriate mitigation measures, operates without creating adverse vibration impacts on sensitive receptors, buildings and infrastructure within close proximity to the project.

The proponent has committed to limit blasting to the hours between 9 am and 3 pm, Monday to Friday, and from 9 am to 1 pm on Saturday. The proponent also committed to monitor blast vibrations, where blasting occurs within 1 km of infrastructure (Appendix 6, commitments 229 and 230). I have also stated conditions for the draft EA for project for blasting noise limits and monitoring in Appendix 2, conditions D2–D4.

I am satisfied that the mitigation measures proposed, the commitments made by the proponent and the conditions I have stated in Appendix 2 for the draft EA, will effectively manage the potential noise and vibration impacts.

5.7 Traffic and transport

The project will use road, rail, sea port and airport infrastructure. Coal will be transported by train from the mine site over the project's two proposed rail spurs with two new connections to the existing Newlands Rail System to the Abbot Point coal terminal. Materials and equipment for construction and operation will be transported by road. The ports of Brisbane, Mackay and Gladstone will be used to import materials and equipment. Movement of personnel by air will be through the Mackay Airport. The state-controlled road network and the local council roads will be used to transport personnel to and from site by bus or car.

DTMR manages the state-controlled roads affected by the project including the Collinsville-Elphinstone Road, Peak Downs Highway, Suttor Development Road and the Bowen Development Road. These roads are fully sealed, two-way, with a maximum speed limit of 100 km per hour (refer Figure 27-1 and 27-2 of Chapter 27 of the EIS and Figure 3-1 to 3-11 of Appendix 26 of the EIS). The project site would be accessed via the Collinsville-Elphinstone Road at two new mine access intersections.

The state-controlled road network surrounding the project is well developed and services existing mining and agricultural industries. Proposed road improvement projects in the region, as identified in the DTMR *Roads Implementation Program 2009–2010 to 2013–2014*, include localised intersection improvement, driver fatigue management, pavement rehabilitation and widening, pavement regrading, bridge replacements and sealing of road shoulders. Current (2010) and forecast traffic movements (year 19), crash statistics (2005–09) and road rest areas (2013) on these roads were sourced from DTMR and provided in Table 27-1 to 27-4 of Chapter 27 of the EIS. The annual average daily traffic (AADT) volume on the Collinsville-Elphinstone Road from the proposed mine site to Glenden was 1111 AADT. DTMR forecasts that traffic volumes on roads surrounding the project area are expected to increase by 3 to 10 per cent over the next five years without the project.

Wollombi Road is a local government road located within the MLA area (refer Figure 5.1). Other local roads within the vicinity of the mine site include Red Hill Road, Ewan Drive and Perry Drive (as the access roads to Glenden) and 29 local roads in the township of Glenden. One stock route (No.405ISSA) with underlying road reserve tenure traverses the site and is discussed further in section 5.1 of this report.

There are no bus routes or school bus routes, public transport or pedestrian and cycle networks in the areas surrounding the project.

5.7.1 Impacts on transport network

Potential impacts of the project on traffic and transport infrastructure identified in the EIS include:

- deterioration of pavement on local and regional roads from project-related heavy and light vehicle traffic
- dust, noise and vibration generated by vehicles travelling to the site and moving around the site
- contamination caused by accidental release of dangerous goods and hazardous materials during transit
- decreases in the level of service and safety of road users resulting from project-related traffic
- increase in passenger movements through Mackay airport due to workforce and mine visitor movements
- increase in imports of materials and equipment at the Port of Brisbane, Mackay and Gladstone
- coal dust and noise generated by increase in numbers of coal trains between the project and Abbot Point along the Newlands Rail System, particularly through Collinsville

Matters resulting from these impacts, unless mitigated, include:

- impacts of project-generated traffic, particularly oversized loads, on existing roads, pavements, intersections and road safety
- the need for road upgrades (passing lanes, rest areas, heavy vehicle intercept areas and fencing), road maintenance works and maintenance contributions
- safety aspects of proximity of mining activity to existing roads and railways
- impacts of connections to and crossings of current road, rail and water pipeline infrastructure
- impacts on current and future users of local roads including Wollombi Road and Suttor Creek Haul Road and stock routes
- requirement for ongoing consultation with local and state agencies regarding upgrades, temporary and permanent closure and relocation of local roads, state roads and stock routes
- requirement for future consultation with state agencies regarding site access road design, over-dimensional vehicle approval, traffic and road management plans and delivering adequate resources for police, fire, rescue and ambulance services

- alternatives for moving workers to and from site, particularly in relation to driver fatigue and safety
- safety concerns and pavement impacts resulting from transporting freight and dangerous goods, including 75 per cent of fuel to be transported by road from Townsville rather than nearby Mackay
- impacts on the local and state road network resulting from the additional traffic generated by the project adding to the traffic generated by existing and known proposed mining projects in the Northern Bowen Basin—in particular, the demand for emergency services following road accidents and the source of materials for road upgrade/maintenance requirements through the life of the mine following destruction of transport infrastructure from adverse weather conditions and flooding.

The EIS investigations did not identify any vulnerable bridges or structures along the proposed transport routes for the project. The proponent has committed to continue working with DTMR and the local road authorities to identify such structures in the future (Appendix 6, Commitment 260).

5.7.2 Road transport impacts and mitigation

Traffic generation impacts

The proponent formulated a Road Impact Assessment (RIA) for the project comprising a traffic impact assessment (TIA) and a pavement impact assessment (PIA) in accordance with DTMR's *Guideline for Assessment of Road Impacts of Development* (GARID).[10]

The proponent estimated the traffic volumes and transport routes associated with the construction of the south phase, operation of the south phase, construction of the north phase and operation of the south and north phase. The summary of the project traffic by task type, origin, route, vehicle type, trip distribution and average daily trips is provided in tables 27-5 to 27-9 of Chapter 27 of the EIS. The future background traffic volumes and project development traffic volumes for both the total AADT and heavy vehicle (HV) AADT and the percentage impact of the development are presented in tables 27-10 and 27-11 of Chapter 27 of the EIS.

Based on the information in these tables, and the assumptions around workforce size, operational hours and transport routes presented in the proponent's RIA, the proponent assessed the additional traffic generated by the project to be minimal when compared to background traffic volumes over the project life.

The EIS concluded that the peak traffic generation will be on the Collinsville-Elphinstone Road from Glenden to the project site during operation of the southern phase and construction of the north phase in year 16 of the project life with a project workforce of 780. The number of vehicle trips (two-way volumes) to transport the workforce is estimated to be 38 571 light vehicles and 5040 buses, as well as over 3500 semi-trailer and truck vehicle trips carrying materials and waste. This equates to

[10] Available at http://www.tmr.qld.gov.au/business-industry/Technical -standards-publications.aspx

an additional 130 average daily trips. I note that an assumption of the RIA was that all construction staff will be transported from Glenden by bus under all circumstances.

The TIA addressed the demands generated by the project on surrounding state-controlled roads during construction and operation and associated potential impacts on road infrastructure. The assessment shows that the traffic volumes on regional roads are negligible to minor, except for the Collinsville-Elphinstone Road south of the project, where impacts are moderate with a 10.5 per cent increase which is over the 5 per cent of the AADT DTMR criterion requiring further investigation.

The two sections of road where the project equivalent standard axles (ESAs) increased the expected background traffic ESAs by more than the DTMR criterion for impact of five per cent are:

- Collinsville-Elphinstone Road between the project site and Glenden
- Collinsville-Elphinstone Road between Glenden and Suttor Development Road.

The TIA was revised for the AEIS (Volume 2, Appendix 3). While the revised TIA in the AEIS provided further information for the purposes of assessing the road impacts, DTMR has since advised me that the actual peak hour traffic volumes on the Collinsville-Elphinstone Road are closer to 15 per cent of AADT rather than the assumed 10 per cent of AADT discussed in section 5.2.1 of the TIA in Appendix 3 of the AEIS.

I require an updated RIA to be finalised and submitted no later than six months prior to the commencement of construction[11]. The RIA is to incorporate the traffic generated to transport to Glenden the reagents and cement shown as sourced from Glenden in tables 4-5 to 4-9 of Appendix 3, AEIS. I have recommended a condition in Appendix 3, Schedule 3 to meet this requirement.

I acknowledge the proponent has committed to transport the majority of workers from the accommodation village in Glenden to the mine site by bus, with only some transport movements by light vehicles, including cars, motor cycles and small trucks, (Appendix 6, Commitment 7) and will implement a policy to discourage the use of light vehicles by the workforce to and from site (Commitment 427). The proponent has committed to consult the relevant road authority about roads that may be used in and around Glenden to service the accommodation facilities. I expect this to occur during the accommodation facility development approval process with IRC as stated in proponent Commitment 395.

Buses will also be provided to transport workers to and from regional centres (Appendix 6, Commitment 261) such as Mackay. This will decrease the traffic generated by the project and reduce the incidents of fatigue and road accidents on regional roads.

The proponent has committed to develop a road-use management plan (RMP) to minimise impacts of the mine on the state-controlled road network. The RMP will

[11] Construction means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project.

include objectives, strategies, monitoring required throughout the project life, corrective actions required, continual report and updating (Appendix 6, Commitment 273).

While I recognise the proponent's commitments, I require the proponent to prepare a RMP for each stage of the project once further details of the design and construction of the project are available. The RMP is to meet the objective of minimising road-based trips on all state and local roads. The RMP is to be submitted to DTMR and the relevant LGA for review no later than six months prior to the commencement of significant construction works (Appendix 3, Schedule 3, Recommendation 7).

Intersection assessment

The project proposes two new road intersections with the Collinsville-Elphinstone Road for mine site access, and two new intersections where the project coal haul roads will cross the Newlands Rail System and Collinsville-Elphinstone Road. These intersections and crossings have the potential to impact on the safety of road users and the flow of traffic, as well as coal train haulage if not appropriately designed and constructed.

The southern access intersection is required when significant construction works commence on the project. An assessment of the requirements for a turn lane based on traffic volumes of the southern intersection contained in Appendix 26 of the EIS determined the form of the intersection. It indicated that the expected vehicle movements do not require further upgrades to the intersection based on 2014 AADT volumes. The intersection will require a short auxiliary left (AUL(S)) turn lane treatment for the left turn movements into the site based on the 2027 AADT volumes. The proponent proposed a concept design (Appendix A, Appendix 26 of the EIS) allowing for a AUL(S) and a channelized right turn treatment (CHR) so that a vehicle travelling past the mine access is unlikely to be impeded by a vehicle turning right into the site, both designed to the appropriate standards, to improve the safety of the intersection.

As stated previously, DTMR has advised that actual peak hour traffic volumes on Collinsville-Elphinstone Road are closer to 15 per cent of AADT rather than 10 per cent as shown in section 5.2.1 of the proponent's RIA. I have recommended a condition that the proponent provide a CHR/AUL turn treatment for the southern access to account for this higher percentage (Appendix 3, Schedule 3, Recommendation 8).

The northern access intersection will be constructed when the northern construction phase begins in year 16 (currently projected as 2030). The proponent has committed to update the turn lane warrant assessment for the northern access intersection with the Collinsville-Elphinstone Road to determine the turning lane requirements associated with this mine access road. As the road is not required until 2030, I acknowledge the commitment that the updated assessment will be conducted prior to 2030 (Appendix 6, Commitment 392). I have recommended a condition on the timing of this assessment (Appendix 3, Schedule 3, Recommendation 8).

The two proposed accesses to Collinsville-Elphinstone Road are not clearly defined in the EIS using DTMR road inventory spread sheet available for the DTMR Mackay/Whitsunday Regional Office. I require the proponent to consult with DTMR during the detailed design stage and provide DTMR with detailed documentation to enable DTMR to assess available sight distances and assess intersection location

suitability. I have recommended a condition that the proponent provide this information in accordance with the DTMR road planning and design policies, principles and manuals current at the time of submitting the required detailed design information to DTMR (Appendix 3, Schedule 3, Recommendation 8).

No assessment is provided regarding the adequacy of existing intersections which could be impacted by the increases in project traffic—Ewan Drive and Perry Drive (for vehicle access to the township of Glenden); and the existing intersections of Collinsville-Elphinstone Road with Suttor and Bowen Developmental Roads. I require this additional assessment of the adequacy of intersections at Ewan Drive and Perry Drive and the intersections of Collinsville-Elphinstone Road with Suttor and Bowen Development Roads to be included in the updated RIA following consultation with DTMR and the IRC on the matter. I have recommended a condition to meet this requirement (Appendix 3, Schedule 3, Recommendation 6).

I expect the proponent to undertake its commitment to consult with the relevant road authority to determine upgrades to the intersection of the Collinsville-Elphinstone Road and the site access road (Appendix 6, Commitment 41) and consult with emergency services about appropriate design of site access roads (Commitment 272) prior to during the design stage of the project and prior to commencement of construction of the project.

The EIS identified that Xstrata Coal Queensland Pty Ltd is the applicant for a mining lease for transport (MLA 70460) which traverses the project area. The project will impact on this transport corridor as the haul roads will intersect it. I require an outcome of safe operation of project related traffic at any future intersection. I note that the proponent commits to design the intersection of the haul roads with Xstrata's mining lease in accordance with the relevant design guidelines and standards to ensure safe operation of the intersection. The proponent also commits to consult with Xstrata about all construction and operational issues when there is interaction between project activities (Appendix 6, commitments 152 and 264).

Crossings assessment

The existing Newlands Rail System traverses the project area from north to south. The project will impact a section of the system with crossings of the rail line needed for project-related haul roads. This is not avoidable. I require the outcome of a safe crossing for mine vehicles that does not disrupt the rail system operations.

The proponent has committed to provide specially designed and constructed infrastructure for crossing points where the Newlands Rail System and the proposed rail component of the Alpha Coal project intersect the project's north-south haul roads. These crossings are to prevent interaction between trains and mine vehicles (Appendix 6, commitments 149 and 150). The proponent commits to design the crossings in accordance with the relevant standards and guidelines and undertake an assessment including an Australian Level Crossing Assessment Model (Commitment 263) to be undertaken as part of the permit requirements for the level crossing through Queensland Rail. I require these commitments to apply to crossings of Adani's proposed North Galilee Basin Rail project rail line and other linear infrastructure that

may be constructed in the declared Galilee Basin SDA infrastructure corridor that traverses the project area.

The Burdekin to Moranbah Water Pipeline traverses the project area from north to south. Project road crossings of the pipeline are required to access project waste rock dumps located to the western side of the pipeline. In response to issues raised by SunWater as the manager of the pipeline, the proponent has committed to make an application to and negotiate with SunWater for a crossing agreement for the crossing points containing conditions for construction and operation of the crossings (Appendix 6, Commitment 409). I am satisfied that this agreement is not required prior to the approval of a mining lease but should be negotiated during the detailed design stage of the project as per Commitment 409.

Over-dimensional loads

The project will result in over-dimensional vehicles, transporting materials and equipment from Mackay, Brisbane and Gladstone, using local and regional roads. These traffic movements will impact on the safety and operations of road networks. The EIS documentation stated that heavy loads, wide loads and over-dimensional and indivisible loads will be identified during construction and operations and all required traffic controls will be implemented to ensure these traffic movements are safe and result in limited impacts to the operation and efficiency of the road network.

The RMP will contain strategies to minimise the impact for over dimension vehicle transportation. The proponent has committed to manage the impacts of these wide loads and will seek approval from DTMR prior to the transport of over-mass or over-dimension loads taking place (Appendix 6, Commitment 28). I note that section 17.5 of the proponent's EM Plan contains a control strategy for over-dimensional loads.

I have recommended a condition in Appendix 3, Schedule 3, Recommendation 9 requiring the proponent to obtain transport-related project permits. In order to obtain the permits, the proponent will be required to prepare a heavy vehicle haulage management plan for any excess mass or over-dimensional loads for all phases of the project in consultation with DTMR's Heavy Vehicles Road Operation Program Office, the Queensland Police Service and the relevant LGA.

Road safety and fatigue

Driver fatigue and safety issues could arise from the increase in project-generated traffic on roads between Mackay, Glenden and the site, transport of hazardous materials and proximity of mine blast events to roads.

The EIS stated that the number and spacing of driver road rest areas, stopping places and towns along the route between Mackay and the project area is in line with the DTMR guidelines and will provide adequate rest facilities. Driver fatigue is avoidable and my required outcomes are for no reduction in driver safety caused by this project and maintaining the safety of the project workforce and other users of road transport infrastructure over the life of the project.

The proponent will develop standard operating procedures, roster control and fatigue management guidelines in accordance with the *Coal Mine Safety and Health Act 1999* and the statutory guidelines set by DTMR. A spillage action plan will be developed for

the transport of goods and equipment to site to minimise the risk of escape of hazardous materials.

I acknowledge the proponent has committed to minimise adverse impacts as follows:

- select the location of access intersections for the mine site on Collinsville-Elphinstone Road based on minimising the impact on safety, operation and efficiency of the road network (Commitment 262)
- undertake specialist handling of hazardous materials when transporting these materials in accordance with applicable legislation (Commitment 50)
- comply with requirements for transportation of dangerous goods and hazardous materials including the Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008 (Commitment 268)
- develop operating procedures, roster control and fatigue management guidelines in accordance with the *Coal Mine Safety and Health Act 1999* (Commitment 266) and implement the driver fatigue management procedures for workers travelling to and from regional centres (Commitment 267) as well as provide information to workers on risks associated with driver fatigue which can be implemented by workers and their families (Commitment 384). The project workforce will be required to comply with the driver fatigue management plans and procedures will be implemented to monitor compliance with the plans (Commitment 428)
- consult with DTMR and regional councils when developing a mine blast design plan and explosives management plan, should temporary closure of roads impacted by the blast site be required (Commitment 397).

Section 17 of the EM Plan establishes project objectives, performance criteria, control strategies and monitoring and audit requirements to protect the health safety and amenity of project employees, visitors and the community using state, local and mine-site road networks.

The control strategies are detailed for:

- minimising project traffic
- mine access intersection upgrades
- interaction of project roads with rail lines
- pavement contributions
- dust and noise management
- driver fatigue management
- transport of dangerous good and hazardous material
- over dimensional loads
- safety and security.

The EM Plan sets monitoring and auditing requirements to assess the effectiveness of the project's transport-related control strategies and confirm implementation of the project's RMP.

The safety of the workforce and the local community and project-specific mitigation measures are discussed further in section 5.8 of this report.

I am satisfied the proponent commitments and the recommended condition to prepare a RMP will minimise project-related traffic accidents caused by fatigue, and protect other road users from hazards associated with transporting hazardous materials and mining activities near public roads.

Pavement impact assessment of state-controlled roads

A PIA was completed for the state-controlled road network to be used by project traffic. It is presented in section 6 of the RIA in Appendix 3, Volume 2, AEIS. The assessment demonstrated that the project is expected to have significant impacts on the pavement life of four sections of pavement on two state-controlled roads. These road sections are:

- Collinsville-Elphinstone Road north of the project site to Bowen Developmental Road
- Collinsville-Elphinstone Road between the project site and Glenden
- Collinsville-Elphinstone Road between Glenden and Suttor Development Road
- Suttor Development Road between Elphinstone and the Peak Downs Highway.

I require an outcome where the project contributes towards the maintenance of the pavement on roads which it impacts. The proponent calculated a maintenance and rehabilitation contribution to be paid by the proponent to the State government. The contribution is based on rates provided by DTMR for this region for the four sections of road where the project increased the background traffic by more than DTMR's five per cent threshold.

The amount calculated for the maintenance contribution was $133 789 across the life of the mine for the pavement impacts on these roads. This figure was reassessed in the AEIS to $86 427. The RIA (section 6.3) assumes a maintenance cost of $3500/km. I have recommended a condition in Appendix 3, Schedule 3, Recommendation 6 of this report that the proponent use the DTMR maintenance and rehabilitation rates (available from DTMR) current at the time the updated RIA is submitted to DTMR. Should the proponent seek approval for a change to the project to allow coal haulage on public roads, a further detailed RIA will be required to be submitted to DTMR with consideration given to road safety and pavement impacts.

The assessment of the four sections of road showed no rehabilitation contribution is required as the assessment determined that the project's impact would reduce pavement life (assumed as 20 years) by 0.01 and 0.31 years which is less than the five per cent of its design life (1 year) trigger.

I have recommended a condition for the proponent to prepare an impact management program to mitigate the impacts of project-generated traffic on pavement condition (Appendix 3, Schedule 3, Recommendation 5). DTMR requires the proponent to undertake an updated PIA in accordance with the GARID as part of their updated RIA (Appendix 3, Schedule 3, Recommendation 6) to determine contributions necessary towards the cost of increased maintenance.

I require the proponent to provide an updated RIA to DTMR, no later than six months prior to commencement of significant construction works, using the Mackay/Whitsunday Road Impact assessment spreadsheet and the regional rates for rehabilitation and maintenance current at the time of submission (available from DTMR) to provide an updated assessment of pavement impacts and maintenance contributions. I have recommended a condition to meet this requirement (Appendix 3, Schedule 3, Recommendation 6). The impact of the project on pavement impact will be mitigated by these contributions to maintenance costs.

Pavement impact assessment of local roads

The EIS stated there may be sections of the local council road network that may be used by project-related vehicles in and out of Glenden and around the project area. Local roads may also be used to provide a connection to the state-controlled road network. The proponent has concluded that the impact on the local road network would be insignificant due to the low number of expected vehicle movements on local roads.

I acknowledge IRC's view that the project will significantly impact service levels of local roads, especially gravel roads, resulting from fuel suppliers and other mining contractors choosing the council-maintained roads as the shortest route to move between mine sites or as an alternative route when state-controlled roads are inaccessible. I also note IRC's concern about the capacity of road infrastructure to withstand adverse weather conditions now and throughout the 50-year mine life, putting at risk the delivery of fuel and materials to this and other mining projects in the region following destruction of local roads from any future flooding.

The proponent responded to IRC's concerns in Chapter 10 of the AEIS by reviewing vehicle movements within the local council road network. The assessment showed 140 average daily trips on local roads in and around Glenden. To manage this impact the proponent has committed to consult with the relevant road authorities about roads in and around Glenden during the development approval process under the SP Act for the project's accommodation facilities in Glenden (Appendix 6, Commitment 395).

In response to IRC concerns about the impact of the project on local roads, I have recommended a condition for an infrastructure agreement to be in place prior to commencement of project construction (Appendix 3, Schedule 3).

Road closures

The project will impact traffic flow on the existing road network through proposed temporary and permanent road closures. I note the proponent's commitment to provide alternative access routes and arrangements for any temporary closures for mine activities, such as blasting events, or relocations of public roads and communicate closures and relocations to the public (Appendix 6, commitments 44, 397 and 424).

The proponent intends to make an application under section 99(1) of the Land Act for the permanent road closure of Wollombi Road prior to disturbance in that area by project activities. I acknowledge that the proponent has consulted with existing owners of Wollombi Station and Suttor North properties which are serviced by this road and they are in support of its closure. I expect the proponent to consult with adjoining landholders and users closer to the application to close the road. I expect the

proponent to seek approval of relevant state and council road authorities regarding this and any future proposed road closures, as per proponent commitments 395, 396 and 424 (Appendix 6).

Stock routes

The proponent intends to make an application to close the unformed road and road reserve underlying the stock route that runs east-west across the project area. This is discussed further in section 5.1.4 of this report. I note the proponent's commitment to consult with and seek approval from the relevant state government agency and local council at an early planning stage of works associated with the permanent closing of this unformed road. The proponent has also committed to communicate these arrangements with the public (Appendix 6, Commitment 424) and provide alternative access routes and arrangements for this and any temporary closures or relocations of stock routes (Commitment 44). I require this consultation to include any changes to the underlying road reserve tenure.

To achieve the outcome of maintaining the safety, condition and efficiency of the state-controlled and local road systems I require the proponent to implement an impact mitigation program (refer to Appendix 3, Schedule 3, Recommendation 5), developed in consultation with DTMR and IRC. The program is to include the development and implementation of a RMP, transport management plan/s (TMP) as required, infrastructure agreement, construction of any works or contribution towards the cost of works, and be finalised prior to project construction.

I support DTMR's view that the proponent must complete required roadworks prior to the commencement of significant construction work and I have made a recommendation that this occur (Appendix 3, Schedule 3, Recommendation 9).

I also support DTMR's view that the RIA must be updated as more detailed information becomes available during the detailed design phase, including an assessment of intersections at Ewan Drive and Perry Drive, and that the proponent must reach agreement with DTMR and IRC on works required and funding contributions. Accordingly, I have made recommendations within Appendix 3, Schedule 3, (recommendations 6 and 8) to address these and related matters.

I require the proponent to address the matters described above to maintain the ongoing safety, condition and efficiency of the state-controlled road network and in accordance with the objectives and provisions of the *Transport Infrastructure Act 1994*, the *Transport Operations (Road Use Management) Act 1995*, other relevant legislation and DTMR policies and guidelines including GARID.

My recommended conditions apply to the life of the project activities relating to significant impacts on the state-controlled and local council road network based on the available information in the EIS.

5.7.3 Rail transport impacts and mitigation

The project includes two rail spurs connecting the product coal stockpiles to the existing Newlands Rail System located in the project area. As detailed in Section 27.7.1 of the EIS, the project will result in four to five trains per day consisting of three

locomotives and 85 coal wagons. The southern 7 km rail spur and the northern 3.5 km rail spur (to be built in year 15 of the project life) both connect to the existing Newlands rail line close to natural surface level.

The proponent confirmed during the assessment stage that no project rail spur crossings are required over state-controlled roads. Should this change in the future, I require the proponent to consult with DTMR regarding the need for undertaking an Australian Level Crossing Assessment Model (ALCAM), relevant Australian and New Zealand standard for assessing level crossings, and determination if the crossing needs grade separation. If warranted, necessary works will need to be included in any existing infrastructure agreement in effect at the time.

Potential impacts of the construction and operation of the project's rail spur component include:

- impact of coal dust from coal trains on human health, health of fauna and flora and productivity of pastures
- access to and impacts on private land, impacts of stream diversions on the Newlands Rail System and impact of the project on Newlands Rail System capacity, including consultation and agreement with infrastructure owners regarding design, construction and operational interface of connecting rail infrastructure.

The impact of coal dust releases from coal trains leaving the mine site will be avoided by the proponent complying with Aurizon's Coal Dust Management Plan (CDMP) and the requirements of the Transfer Facilities Licence regarding dust mitigation measures including veneering and load profiling (Appendix 6, Commitment 382). Section 5.4 of this report evaluates the impact of dust nuisance caused by the project and I have stated conditions for the draft EA relating to dust mitigation for the project as a whole in Appendix 2, conditions B1 and B2 to achieve the required outcome that air quality objectives at all sensitive receptors are met.

With regard to the potential impact on the Newlands Rail System, I note that the proponent has addressed Aurizon's concerns regarding impacts on the Newlands Rail System in Chapter 11 of the AEIS. The proponent has stated in section 27.7.1 of the EIS that the project will have negligible impact on the operating capacity of the Newlands Rail System. Appendix 6 of this report contains proponent commitments for ongoing consultation with Aurizon for access to the existing Newlands Rail System corridor following the below rail access process as outlined in the Access Undertaking (Commitment 400).

The proposed rail spurs are located entirely within the mining lease, and their impact on the environment during construction and operation will be managed by the conditions I have stated for the draft EA (Appendix 2 of this report) and recommended conditions for future State and Commonwealth government approvals (Appendix 3 of this report).

I have not considered the impacts of transporting coal along the Newlands Rail System for 150 km to Abbot Point as the railway was part of a separate approval process and environmental assessment of the Northern Missing Link project and evaluated in the *Queensland Rail Northern Missing Link Coordinator-General's Report*, October 2006.

5.7.4 Sea port and airport impacts

Approximately 15 000 tonnes of equipment and material will be imported for the project over its life. The proponent assessed that this represents less than 0.05 per cent of the amount imported by the ports of Brisbane, Gladstone and Mackay in 2010/2011. Therefore, there would be a negligible impact on port capacity and operations, vessel traffic management, navigation aids and ship sourced pollution from imported materials and equipment. I accept this assessment and have not conditioned this component of the transport impact, noting that the vessels delivering goods for the project are regulated by Maritime Safety Queensland guidelines.

The project will export coal through the Abbot Point coal terminal. The proponent has secured capacity for five Mtpa and is negotiating for an additional five Mtpa of coal product to be exported. The environmental impacts of the terminal operations and increased shipping movements through the Great Barrier Reef were evaluated through the EIS process for the terminal and approved subject to conditions from the State and Commonwealth Governments.

Project workforce will use Mackay Airport to fly to and from the region. Over a million passengers pass through the Mackay airport each year. The estimated project workforce may result in around 15 000 additional airport movements per annum at Mackay Airport. The EIS has assessed this as less than 1.5 per cent increase and result in a negligible impact to the airport capacity and operations. I consider this an acceptable outcome, as the Mackay Airport completed a terminal upgrade in 2013 and is commencing upgrades to drop-off facilities in 2014. Therefore I have not conditioned the movement by air of project personnel.

5.8 Hazard and risk

The proponent conducted a preliminary assessment of hazard and risk, including health and safety, to people and property from the construction, operation and decommissioning of the project. The hazard and risk assessment (HRA) was undertaken in accordance to the principles set out in *AS/NZS ISO 3100 Risk Management – Principles and Guidelines* and *IEC/ISO 31010 – Risk Management 2009 - Risk Assessment Techniques*.

The HRA evaluated the predicted hazard and risk impacts and proposed mitigation measures for the project. Potential hazards and risks are identified and discussed in EIS Chapter 32, Section 32.3 to Section 3.26 and EIS Chapter 33, Section 33.4.

There are mandatory requirements for the proponent to comply with statutory and regulatory obligations (including associated Australian Standards and Codes of Practice) concerning hazards and risks. These are detailed in EIS Appendix 32, Part 2. These requirements were applied to obtain a reportable risk analysis of the potential of occurrences or events. The proponent has committed to address these risks (Appendix 6, commitments 328–384).

The potential hazards and risks associated with the project include bulk storage of fuel and explosives and coal mine operations. The hazard or risk potential was measured

with the expectation that known standardised risk prevention measures would be implemented at the site.

Most issues were assessed as low to medium risk level, with those assessed as high risk level, predominately due to fatality or serious injury, were also assessed as rare to unlikely. EIS Chapter 32, Section 3.26 and EIS Appendix 32 identified additional management practices for project activities assessed as having a residual high risk level which included:

- transport
- bulk storage
- construction and installation
- coal mining operations
- waste management
- maintenance
- decommissioning
- interaction with external factors and third parties.

The proponent proposed that the application of the additional management practices within the draft risk management plan, as shown in EIS Appendix 1 of Appendix 32, will reduce the potential hazard and risk impacts for the project.

EIS Appendix 33 outlined both the current and planned emergency resourcing and responses to potential hazard and risk events. I acknowledge the concerns of the Public Safety Business Agency, Queensland Health and IRC that with this project the demand for emergency services and health services provision could be beyond the available resources proposed. I consider the proponent has addressed these concerns in EIS Appendix 33, Section 1.2 and 1.3 by recognition that such areas need ongoing consultation, whilst supplying a preliminary assessment of project requirements.

I note the proponent has committed to undertake reviews of the emergency management plan and other related plans to address any future hazards and risks for the project (refer to Appendix 33, Section 6 of the EIS).

The proponent's commitments register references these matters; including assisting the Queensland Fire and Rescue Service (QFRS) with issues such as bushfire mitigation and regularly reviewing the effectiveness of the emergency management plan to address hazards and risks for the project (Appendix 6, commitments 328–384).

Commitment 380 confirms proper risk management strategies for hazards and risks will be developed by the proponent at the final detailed design stage and when mine operating plans are prepared prior to the construction and operational phases. The proponent has also stated that ongoing consultation will be undertaken with relevant emergency agencies on hazard and risk issues, including consultation on local and regional disaster management plans (EIS Appendix 33, Section 1.2). I consider that these regular consultative reviews of project activities and events provide sufficient opportunities to review potential project hazards and risks.

Based on the information provide in the EIS and AEIS, I conclude that the potential hazard and risk assessment for the project is adequate. I note the proponent has

committed to further review relevant management plans to address hazards and risks for the project. I consider the strategies and processes proposed to develop hazard and risk management consultations with relevant emergency services to be beneficial in reducing the hazard and risk potential for the project.

By the proponent remaining committed to such undertakings, I am satisfied that the hazards and risks for the project and the potential health and safety impacts will be appropriately managed throughout the life of the project.

5.9 Cultural heritage

5.9.1 Indigenous cultural heritage

Indigenous cultural heritage (ICH) in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003* (ACH Act). To comply with the duty of care provision under section 23 of the ACH Act, a proponent of a project which requires an EIS must prepare a cultural heritage management plan (CHMP). The CHMP is an agreement between the proponent and the native title claimants and provides for the identification and management of ICH.

In accordance with the ACH Act, the proponent has developed CHMPs with the relevant Aboriginal parties for the project area being the following native title claimants:

- the Jangga People (Federal Court No.QUD6230/98, National Native Title Tribunal No. QC98/10, QCD2012/009)—have a native title consent determination which overlaps the southern section of the project area, being MLAs 70434, 70435 and 70436 and was established and approved by the Chief Executive of the former Department of Environment and Resource Management (DERM) in 2011. This function is now with Department of Aboriginal and Torres Strait Islanders and Multicultural Affairs (DATISMA).
- the Birriah People (previously known as Birri People) (QUD6244/98, QC98/12)—have a registered native title claim which overlaps the northern section of the project area, being MLAs 10355, 10356, and 10357 and was approved by the Chief Executive of the former DERM in 2011.

Figure 28.1 of the EIS provides an overview of the above mentioned native title claims. Both CHMPs have been lodged with the DATSIMA Cultural Heritage Coordination Unit.

ICH was identified and project impacts discussed in Volume 2, Chapter 28 of the EIS and Appendix 28 and 29 of the EIS. A desktop review was conducted. Table 28-1 of the EIS provides a list of cultural heritage registers and sources consulted. The project area does not contain any places registered on the national or local government ICH registers.

There were 397 registered sites or objects on the DATSIMA cultural heritage register within the Birri or Jangga native title claim areas in the project area. Appendix 1 of both Appendix 28 and 29 of the EIS listed these sites and items recorded including artefact scatter, cultural site, hearth oven, landscape feature, resource area, scarred/carved tree, campsite and quarry. Open stone artefact scatter and isolated artefacts are the most common types of cultural site recorded in the area.

Field surveys were completed by relevant representatives of the Indigenous parties with the assistance of an archaeologist in accordance with both CHMPs. Culturally significant items/artefacts identified during field surveys in the project area included:

- scarred trees (associated with container, shield, canoe, shelter, or for wrapping the deceased in burial ceremonies or as a burial place for bones or the entire body)
- heating or cooking fireplaces in holes dug in the ground
- ceremonial places and a network of traditional travelling trails
- natural features in the landscape with high significance as story places
- aspects of the natural environment including bark from trees and outcrops of ochre.

The project would have direct impacts on cultural heritage associated with ground disturbance in the project disturbance footprint and indirect impacts associated with vibration, air blast overpressure and traffic. The landscape will be significantly modified by project activities including ground cover clearing, excavation activities and the construction of mining and transport infrastructure. The cultural landscape will be permanently impacted by the creation of waste rock dumps and final mine voids.

Impacts on heritage sites and values will be primarily associated with the disturbance of the ground surface as a result of the project. Approximately 40 of the 90 known sites lie within the project disturbance footprint. There are likely to be other sites in the project disturbance footprint in areas not included in the field survey. This disturbance impact is unavoidable with current mine planning, but can be reduced and managed.

The impact on the known and unknown sites will be managed by the proponent in accordance with the approved CHMPs. No project activities would commence within the project area until the agreed ICH assessments, as detailed in the CHMP, have been undertaken to ensure the appropriate management of ICH. In the event that an item or area of ICH is found, the proponent would implement the mitigation measures identified in the ICH EIS chapter, the EM Plan and CHMP. The CHMPs allow for:

- ongoing communication and involvement with both Aboriginal parties over their respective areas
- a process for including Aboriginal people, associated with the development areas, in protecting and managing Aboriginal cultural heritage
- processes for mitigating, managing and protecting identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
- provisions for managing the accidental discovery of cultural material, including burials
- a clear recording process to assist initial management and recording of accidental discoveries
- a cultural heritage induction for project staff
- developing a cultural heritage awareness program to be incorporated into the contractor/employee manual and induction manual that is in the form of a plain language, short document that is easy for contractors and staff ‘on the ground’ to understand

- a conflict resolution process.

Based on the measures provided in the EIS, the registered CHMPs and the legislative requirements of the ACH Act and the *Native Title Act 1993* (NT Act), I am satisfied the impacts on ICH would be appropriately managed throughout the life of the project.

I require the proponent to implement all measures contained within the ICH EIS chapter, Section 18 of the EM Plan and the proponent commitment register (Appendix 6, commitments 275–278).

I consider that the implementation of the measures provided in the EIS and EM Plan would satisfy the duty of care requirements under the ACH Act and NT Act, and would ensure the outcome of adequate identification and management of Indigenous cultural heritage places and objects by the proponent and the native title claimants as custodians of their cultural heritage.

5.9.2 Non-Indigenous cultural heritage

Non-indigenous cultural heritage (NICH) of the project area was addressed in Volume 2, Chapter 29 and Appendix 27 of the EIS.

Places, items and artefacts of historical cultural significance occur in the project area. The project area does not contain any cultural heritage sites or places registered on the World Heritage, National, State or local government NICH registers. Appendix 27 of the EIS provides the data from the proponent's assessment of the unlisted sites discovered following desktop review, engagement with local stakeholders, predictive modelling and field surveys. Due to the size of the project area, intensive surveys of the entire ground surface of the project disturbance footprint were not undertaken by the proponent. The selected field surveys identified remains of old drovers and stockman's camps, graves, old homesteads, stock routes, mills, tanks, old dumps, metal and wooden artefacts. This assessment found that twelve sites of heritage significance were identified with two old drovers and ringers camps falling within the project area. The location of these sites is presented in Figure 29-1 of the EIS.

The two old drovers and ringers camps are approximately 300 m from the pit rock dump associated with South Pit 1 and 800 m from the northern MIA and 2 km from the northern rail loop respectively. The Wollombi homestead complex is 850 m from the out-of-pit waste rock dump associated with South Pit 2. The graves on the Byerwen homestead complex and the Mount Lookout homestead complex shown on Figure 29-1 of the EIS have regional significance. Table 29-3 of the EIS identifies the likely impact of the project on each of the NICH sites as well as the cultural significance of each site.

The project has the potential to impact on the cultural heritage landscape of the old drovers and ringers camps. The required outcome is to minimise destruction of regionally significant NICH sites and artefacts. I acknowledge that Section 18 of the EM Plan (Cultural Heritage Management) includes protection objectives, performance criteria, control strategies and monitoring requirements for known heritage values in the Historical Cultural Heritage Management Strategy and expect these management measures to be implemented to avoid and reduce destruction of these sites and objects.

The proponent has committed to cultural awareness training of its workforce through site inductions and toolbox talks for personnel, including a training manual on managing cultural heritage (Appendix 6, commitments 279 and 284). In the event that an item/s is identified, the proponent will engage an appropriately qualified person to determine a management strategy for the site and prepare a site-based management plan where required and conduct audits during the development and implementation of a management plan (Appendix 6, commitments 283 and 285).

I recognise that there is potential for additional heritage sites and objects to be uncovered during project construction. In the event that any heritage values are discovered during project activities, I require the proponent to follow the discovery process set out in Section 29.6.2 of the EIS.

Based on the proponent's commitment to implement the management measures identified in the EM Plan, the proponent's commitment register and the requirements of the *Queensland Heritage Act 1992* (should an item of cultural significance be identified), I am satisfied that impacts to NICH will be minimised and appropriately managed throughout the life of the project.

6. Social and economic impacts

6.1 Economic impact assessment

The project aims to establish an open-cut coal mine in the Bowen Basin as a commercial energy resource for the supply of coking and thermal coal to the international coal markets, mainly the Asian steel mills. The project would take advantage of existing coal transport infrastructure and port facilities to capitalise on increases in global demand for coal. Demand for coking coal and high quality thermal coal is expected to increase over the next decade as energy demands increase—particularly from China, India and Korea.

The project could meet Queensland Government objectives in realising the ongoing development of the Bowen Basin coal resources while the community benefits are supported, therefore contributing to a four-pillar economy.

Overarching project-wide beneficial economic impacts could include:

- a $1.76 billion investment
- direct and indirect value added to the Queensland economy during the operations phase of $1133 million per annum
- workforce total of approximately 350 people during construction and 545 people per year during operations
- state and federal government taxes including mining lease rentals, payroll tax, company tax, income tax and goods and services tax
- predicted royalties payments to the Queensland Government for the coal production of approximately $13.2 billion over the life of the project
- direct and indirect local, regional and Indigenous employment opportunities beyond traditional agricultural sector roles and adding to the existing mining opportunities

- additional employment opportunities in the first construction phase of 5609 direct and indirect full time equivalent (FTE) jobs in any one year
- following the ramp up of operations (year 1-4), additional employment opportunities of approximately 6200 direct and indirect FTE jobs per annum
- workers and their families relocating to Glenden provide opportunities for increased participation in volunteering, and local sporting and recreational activities/groups
- opportunities for local and Queensland suppliers and businesses through project expenditure and flow-on activity.

The economic impact assessment estimates that the project could provide economic benefits to the region, state and Australia, during both construction and mine operations. Alternative mining methods and alternatives to the project, such as the 'do nothing' option, are detailed in Section 2.2 of the EIS. If the project does not proceed, the ongoing global demand for coal could be lost to an international competitor, with unrealised export revenue, coal royalties, employment opportunities and ancillary business opportunities for Queensland. Unrealised government revenue would be approximately $13.2 billion over the life of the project and approximately 6200 FTE direct and indirect jobs per annum would not be created and the environmental and social impacts assessed in this report would be avoided.

6.2 Social impact assessment

The social impact assessment (SIA) was undertaken by the proponent as a component of the EIS. The SIA identified and assessed social and economic impacts and defined the roles of the proponent, government, community and other key stakeholders. It also proposed measures to enhance, mitigate and manage impacts throughout the construction, operation and decommissioning phases of the project.

The township of Glenden is the primary social and cultural area of influence relating to the project. As there are likely to be some broader project related effects, a secondary social and cultural area of influence was defined within the EIS. This encompasses the local government authorities of IRC, WRC and Mackay Regional Council. This broad regional area is referred to as the Northern Bowen Basin.

The proponent has committed to working collaboratively with the Glenden Stakeholder Engagement Group and in partnership with IRC in relation to the Royalty for the Regions Program to mitigate relevant social impacts across the region.

The Local Area Infrastructure Program (LAIP) is an initiative that is proposed under the Queensland Government's *Managing the impacts of major projects in resource communities framework 2013* to address emerging issues and impacts on a broader scale. LAIPs will prioritise strategic infrastructure needs, address timing issues and explore how funding of projects can be aligned. LAIPs will link closely to the Royalties for the Region Program.

This report summarises the potential impacts across the primary and secondary social and cultural areas and rates the significance of each impact as derived from an impact assessment framework.

Potential impacts identified in the SIA include:

- increased temporary and permanent housing and accommodation requirements
- increased demand on existing social infrastructure, facilities and services as a result of population growth
- road safety concerns due to increased traffic on local roads and highways
- contribution to the regional skills shortage and the potential labour market drain into the mining industry
- health and safety concerns associated with commuting and shift work and the real or perceived deterioration of safety in Glenden
- engagement with the local community.

The proponent has responded to potential impacts identified during consultation and the EIS process with a series of actions and these are summarised in Table A1, Appendix 4 of this report.

These actions are further supported by a range of plans, procedures and policies that address specific issues or impacts of the project in greater detail. Some examples of these include a traffic management plan, QCoal Foundation—Social Investment Strategy, Workers Code of Conduct, and a complaints and dispute resolution process. For further information on these plans, procedures and policies refer to the social impact assessment at **http://byerwen-eis.qcoal.com.au/appendices-social-impact-assessment-bca-80**.

Further engagement with stakeholders is required to finalise the baseline data, targets and indicators needed to ensure that actions and supporting documents listed above are completed and implemented prior to the commencement of construction.

The subsequent sections of this report consider the extent to which the actions, commitments and supporting mechanisms enhance, avoid, mitigate and manage the impacts of the project.

6.2.1 Housing and accommodation

Glenden is a purpose-built mining community with housing stock provided by Xstrata for employees of the Newlands mining operations. The Glenden housing market is not typical of housing markets across Queensland as 94 per cent of all housing is being rented. Given that the rental market is predominately subsidised residential worker housing, there should be no impact on the affordability of housing in Glenden. There will be demands based on housing capacity, however the strategies to be adopted by the proponent will mitigate this impact during the life of the project.

The proponent has developed a Workforce Accommodation Strategy and all temporary and permanent housing will be provided by QCoal. The construction workforce will initially be accommodated in a village style accommodation providing up to 350 rooms to also be used for operational workforce as required.

Land for the accommodation village is yet to be acquired. Industrial land owned by IRC has been identified and is considered suitable for the construction and contractors accommodation village. IRC supports the proponent's approach to secure sufficient land to provide an accommodation village on the identified land. The IRC will request tender submissions for the land and the proponent will submit a proposal with a view to

acquiring this land. If the land is not acquired or relevant approvals not granted then the proponent will seek to locate the accommodation camp outside of Glenden either at or near the mining lease.

The proponent's strategy for operational worker accommodation is currently based on 30 per cent residential and 70 per cent fly-in fly-out (FIFO), drive-in drive-out (DIDO) or bus-in bus-out (BIBO). These percentages have been used as a baseline for accommodation planning by the proponent, and are lower than the current number of Xstrata workers living locally in Glenden. The proponent expects this percentage will change over time. Based on the assumption that 30 per cent of operational workers will reside in Glenden, the proponent's housing and accommodation plan will provide a variety of accommodation for the total operational workforce as shown in Table 6.1 .

Table 6.1 Operational worker accommodation

Operational phase	Workforce number (based on 30 per cent resident workers)	Accommodation provision (per number of workers)
545 workers (maximum)	381 (non-residential) 164 (residential)	200 rooms in workforce accommodation (400 non-residential workers) 120 houses through Glenden Urban Design Master Plan (120 workers) 20 duplexes through Glenden Urban Design Master Plan (50 workers)

For further details on accommodation provision throughout the life of the mine, refer to the SIA (sections 7.36 and 7.3.7) of the EIS.

The residential accommodation for operational workers will be built on acquired surplus Department of Education land which has received development approval. It will consist of duplexes for singles or couples and houses for families. The proponent will develop a Glenden Urban Design Master Plan for residential growth and development, to provide a mix of 140 houses and duplexes to maximise local residency by attracting families, singles and couples and to take into account functionality, comfort, recreational uses, and access to services and integration into the existing community.

I expect that the proponent will meet the housing and accommodation needs of the project workforce during the construction and operation phases of the project, whilst avoiding, managing or mitigating project-related impacts on housing supply and choice in Glenden.

I note the proponent's commitment to provide sufficient housing to accommodate the entire construction and operational workforce, including contractors, for the life of the project through the delivery of their Workforce Accommodation Strategy.

I note the proponent's intention to maximise the number of operational workers and their families living in Glenden by developing a Glenden Urban Design Master Plan on land that QCoal is to acquire for permanent residential housing. The proponent has

committed to provide 120 homes and 20 duplexes for resident workers and these will be constructed as required from years 1 to 14 of the project.

The proponent has also committed to an accommodation village with approximately 200 rooms to accommodate the FIFO, DIDO and BIBO workforce during construction and operation of the mine.

I have imposed Condition 2 in Appendix 1 that requires the proponent to provide an annual report to the Coordinator-General for five years from the commencement of construction. The report must describe actions, outcomes and adaptable management strategies to avoid, manage or mitigate project-related impacts on the housing market in Glenden. The report should also describe actions and management strategies addressing direct impacts arising from operational activities undertaken during the five-year reporting period.

6.2.2 Workforce management

The proponent has stated that it is committed to recruiting workers from the local and regional areas and as discussed, will provide temporary and permanent housing options for workers as part of its commitment to housing choices contained in the Workforce Accommodation Strategy. The proponent has proposed that the workforce will be predominately FIFO, DIDO or BIBO during construction and approximately 30 per cent of workers will live in Glenden during operations. The mine will operate a two-shift, seven-day rotating roster.

The proponent has developed a Workforce Management Strategy that commits to implementing specific workforce management initiatives and uses partnership arrangements to respond to identified project impacts.

The Strategy includes a requirement that all contractors will be required to develop a workforce management plan. The plan will describe their approach to recruitment, management, and a commitment to undertake skills development and training programs for their workforce. The plan will also include requirements regarding cultural sensitivity, skills development and recruiting and retaining Indigenous employees. Contractors will not be selected if they do not meet these requirements. When the mine becomes operational the proponent will set revised targets for the employment of women and Indigenous workers and actively encourage contractors to work with disability employment agencies to assist people with a disability to gain employment at the mine.

The proponent will work with education and training providers across private and government sectors in relation to future workforce requirements to assist them in developing programs to respond to demand. It has also committed to providing an education grants program, training pathways and initiatives to support development of high school students, and support trainee and graduate students in its operations. In addition the proponent will work with Indigenous training providers for the development of a skilled workforce and in obtaining appropriate certification. For Indigenous school students the proponent will continue to implement its Indigenous educational grants program and also investigate pathways for work opportunities at the mine.

I expect the proponent to maximise local employment opportunities over the life of the project, including the representation of local Indigenous people and other disadvantaged groups. I also expect the proponent to provide training and development opportunities for people locally and regionally, to improve skills and gain employment in the mining industry.

I note that the proponent requires all contractors to develop a workforce management plan and it is required to meet specific requirements in relation to recruitment and management of their workforce.

It is my expectation that should the downturn in the mining industry be reversed the proponent will need to consider the direct impacts this will have on the availability and recruitment of skilled workers and will need to consider mitigation and management strategies to respond to these revised impacts. The proponent will need to monitor, review and report on these impacts and any changes to their Workforce Management Strategy.

I expect the proponent fulfil their commitment to work with all identified stakeholders contained in the EIS to implement the identified workforce management strategies to ensure that the outcome of these strategies can be effectively monitored and reported.

Given the potential for the workforce issues, requirements and impacts to change over time, I have imposed a condition (Appendix 1,Condition 2) requiring the proponent to provide an annual report to the Coordinator General for a period of five years from the commencement of construction. The report must describe the actions, outcomes and adaptable management strategies to enhance local and regional employment, training and development opportunities.

The annual report should also report on actions and management strategies addressing direct impacts arising from operational activities undertaken during the five-year reporting period.

6.2.3 Health and community wellbeing

The community in the study area considers that mining is critical in supporting ongoing prosperity and growth in the region. During the stakeholder and community engagement process the community identified the need to maintain the following key community values:

- a distinct community identity, being part of the mining and rural community that values the hard work, determination and the financial rewards provided by its creation
- a cohesive and stable community with a strong perception of community safety, availability of social services and facilities, importance of access to health, education and recreational services
- to maintain a rural lifestyle which is highly valued by residents.

The SIA acknowledged the concerns expressed by the community and that the expansion of Glenden may place additional demand upon access to existing social and community infrastructure and services. It identified the following potential impacts requiring mitigation or management:

- increased demand for allied, mental and emergency health services both in Glenden and the broader local government region
- increased demand for essential services including water, sewerage, electricity, telecommunications and waste management
- community concerns in relation to population increase including increased traffic and road use, deterioration of community safety in Glenden and challenges on family life associated with shift work and FIFO operations
- the capacity of emergency services to be able to respond to increased demand as a result of the expansion of Glenden
- maintenance of access to and use of recreational and community infrastructure needs for all residents.

In relation to the health and community wellbeing impacts, the proponent has committed to a number of strategies including engaging with health care agencies and professionals to understand issues arising, monitor impacts on the community and agree strategies that address these impacts during the life of the project.

The development of the Glenden Urban Design Master Plan by the proponent as part of its housing strategy will also consider the need to provide trunk infrastructure and adequate capacity of essential services to meet anticipated population growth resulting from the project.

To ensure that impacts of road use, emergency services, community safety and access to and use of community infrastructure are mitigated, the proponent is committed to develop and implement programs, partnerships and processes in collaboration with key stakeholders and community to improve or maintain current standards.

I expect the proponent will:

- avoid, manage or mitigate direct project related impacts on local community services, social infrastructure, and community safety and wellbeing
- engage, collaborate and work in partnership with key stakeholders and community to implement strategies that minimise the impacts on the delivery of health services and emergency services
- implement all agreed investment and strategy commitments as identified in the SIA.

It is clear that the community wishes to maintain its values and therefore it is imperative that the impacts identified and acknowledged by the proponent, on the local and regional community infrastructure need to be effectively managed in order to maintain the strong and cohesive community identity and the rural lifestyle currently enjoyed in Glenden.

I acknowledge the commitment by the proponent to the establishment of the QCoal Foundation and the expansion of the QCoal Community Grants Program with the intention that these programs will fund and contribute to community development grants, initiatives, educational grants and bursaries. This will be in consultation with the Glenden Stakeholder Engagement Groups and other relevant stakeholders to identify and establish community priorities.

The potential impact on the demand for health services and the community concerns with health and safety, are of significance and will need to be managed and mitigated. This has resulted in the proponent making commitments to establish productive collaborative partnerships and to implement agreed strategies in conjunction with stakeholders where appropriate. These include:

- providing on-site medical facilities for the project workforce
- developing a health and safety plan and an emergency management plan which implements preventative and emergency measures on and off site
- working in partnership with councils to support the Royalty for the Regions Program with respect to the adequate provision of health services
- developing and implementing workforce wellbeing programs, including providing transport for FIFO workers, counselling services, health, fitness and fatigue management programs and preventative health education
- contributing to integration and cohesion programs for relocated families living locally, by supporting and working in partnership with local community organisations
- developing a Workers Code of Conduct for all employees targeting all levels of contractors and consultants for the construction and operational workforce
- sponsoring the Royal Flying Doctor Services with a target of $1m and support of auxiliary services such as the mobile dental unit.

Given the need to either develop and/or implement a number of the committed strategies, I have imposed a condition requiring the proponent to provide an annual report to the Coordinator General for a period of five years from the commencement of construction (Appendix 1,Condition 2). The report must describe the actions to avoid, manage or mitigate direct project-related impacts on the local services, social infrastructure and community safety and wellbeing.

The annual report should also report on actions and management strategies addressing direct impacts arising from operational activities undertaken during the five year reporting period.

6.2.4 Community and stakeholder engagement

Engagement activities undertaken by the proponent have included a broadscale community and stakeholder engagement consultation program for the overall EIS, which have directly informed the SIA. Key stakeholders included impacted landholders, occupiers and local residents, local and regional communities, Indigenous groups, local and state government agencies, business, industry, community agencies and service providers.

Engagement activities identified a range of issues and concerns of different stakeholders, and informed development of the local and regional social baseline studies in the SIA.

The proponent has committed to ongoing community and stakeholder engagement and has developed a Stakeholder and Community Consultation Program for implementation during pre-construction, construction and operation. The proponent has joined the Glenden Stakeholder Engagement Group, which includes representatives

from government, industry and community and represents the interests of the Glenden community, business and key stakeholders. Key outcomes for the group include:

- addressing priority issues through partnerships
- provide project updates to the broader community
- reporting on progress of mitigation and management strategies being implemented to address social impacts.

In addition, the proponent has developed a complaints and dispute resolution process to facilitate prompt, confidential and fair investigation into all incidents and complaints for the community, stakeholders and employees.

I expect the proponent to:

- engage and consult with the community to ensure that it is well informed about the project's impacts and their concerns are considered in reaching decisions
- collaborate, consult and negotiate with local and state government agencies, business, industry, community agencies and service providers and other stakeholders as required to maximise opportunities, address impacts and implement agreed outcomes and commitments.

I consider the consultation process and engagement mechanisms adopted by the proponent during the EIS were sufficient to identify potential impacts arising from the project. My expectation is that the commitments made by the proponent to on-going engagement for the life of the project through the delivery of their Stakeholder and Community Consultation program, representation on the Glenden Stakeholder Engagement Group and the management of the complaints and dispute resolution mechanisms, will be implemented.

I have imposed a condition for the project (Appendix 1,Condition 2) requiring the proponent to provide an annual report to the Coordinator-General for a period of five years from the commencement of construction. The report must describe the actions to inform the community about project impacts and show that community concerns about project impacts have been taken into account.

The annual report should also report on actions and management strategies addressing direct impacts arising from operational activities undertaken during the five year reporting period.

6.2.5 Local business and industry content

The town of Glenden is a mining town that was established by Xstrata to support the Newlands Coal Mine which was established in 1981. The services and public facilities of the town are now administered by IRC. IRC and WRC areas have a long history of mining and supporting business activities to service the industry. This project provides further opportunities for these local and regional business to provide goods, services and expertise whilst achieving business growth and employment opportunities.

The EIS identified the following opportunities and challenges to maximise local and regional business participation:

- opportunities for local and regional business to benefit economically through services to the mine and increased population in Glenden
- local industry participation and the ability for business to provide goods, services and support directly to the project
- the potential to increase the range of services and business opportunities for the region
- increased employment opportunities, both direct and indirect and local training and skills development
- potential skill drain from local and regional businesses to the project if the mining industry returns to pre-2013 employment status.

The proponent has committed to adopting the Queensland Resources Energy Sector Code of Practice for Local Content. In addition, the proponent has committed to promoting, encouraging and building capacity of local and regional service providers and businesses through the implementation of their Regional Procurement Program. Strategies include the following:

- maximising local industry participation giving preference to Australian manufactured equipment that complies with relevant standards and specifications, using best practice methodologies
- contractors will be required to inform the proponent how they will source sub-contractors with a focus on local and regional suppliers as part of their tendering process and in accordance with the Code of Practice for Local Content
- regular contact with and presentations to businesses and industry associations to provide understanding, promotion and progress of procurement and supply opportunities within the region
- liaison with industry networks and workforce development agencies to identify and notify local and regional suppliers of business opportunities
- sourcing contractors in accordance with Code of Practice for Local Content to construct and operate the CHPP
- identifying and informing the Indigenous community, business and employment agencies of local and regional business opportunities to achieve business growth and provide additional employment
- supporting the business development initiative by Leighton to provide Indigenous groups with assistance in establishing business operations and processes to assist in securing subcontracts on the project. This includes working with Leighton and traditional owners on the development of the program and ongoing liaison with and providing information to program coordinators on subcontracting opportunities for the project.

These strategies and initiatives will be developed and implemented in conjunction with all levels of government and key stakeholders identified in the SIA.

I expect the proponent to be a signatory to the Queensland Resources and Energy Sector Code of Practice for Local Content and to ensure that Queensland suppliers, contractors and manufacturers are given an opportunity to tender for project-related business activities. I acknowledge the commitments made by the proponent to

implement a Regional Procurement Program and Indigenous initiatives that will provide local and regional content strategies to assist business to achieve growth and provide additional employment opportunities.

Proponents adopting the Queensland Resources Council Code of Practice will submit an annual Code Industry Report to the Queensland Resources Council demonstrating how the principles and framework of the code have been applied. My expectation that any commitments and any initiatives adopted as a result of continued engagement with local and regional business will be reflected in these reports.

7. Environmental management plan

The proponent prepared an EM Plan for the project (Appendix 9 of the EIS) as required by former section 150(c) (application documents for an EA mining activities) and former section 201 of the EP Act (as in force on 30 March 2013).

Under transitional provisions of the amended EP Act arising from the *Greentape Environmental Protection (Greentape Reduction) and Other Legislation Amendment Act 2012*, an EM Plan for the mine site is a requirement before a draft EA can be issued by DEHP for public notification. The EM Plan for the project will form part of the application documentation for an application for an EA (mining activities) to DEHP.

The EM Plan specifies proposed environmental management strategies, actions and procedures to be implemented to mitigate adverse and enhance beneficial environmental and social impacts. It also specifies monitoring, reporting and auditing requirements, the entity responsible for implementing proposed actions, proposed timing, corrective actions if monitoring indicates that performance requirements have not been met.

Table 7.1 presents an overview of the content of the EM Plan and relevant draft EA conditions I have stated in Appendix 2 of this report. The proponent has committed to implement the approved EM Plan (Appendix 6, Commitment 9).

The proponent amended the EM Plan during the EIS assessment process in response to my request for additional information. I assessed the EM Plan submitted to me on 14 May 2014 (version 4). Based on my assessment and advise from DEHP that it substantially complies with the content requirements of the former section 203 of the EP Act and is suitable for submission with the EA application under section 150 of the EP Act, I have determined that this version of the EM Plan contains sufficient information to state draft EA conditions for the project. I have stated conditions in Appendix 2 which must attach to the EA for the project.

Before carrying out activities under a mining lease, the proponent will be required to submit a plan of operations, under Chapter 5, Part 7 of the former EP Act, to DEHP after the EA is issued.

Table 7.1 Overview of the environmental management plan

EM Plan matter and chapter	Relevant sub-plan	EIS/AEIS section and status	Relevant draft EA conditions (Appendix 2 of this report)
Chapter 3 Water management	Water Management Plan	EIS Chapter 8 and AEIS Appendix 4. To be developed prior to constructing water management infrastructure.	Condition F26
Chapter 4 Environmental management	Emergency Response Plan	EIS Chapter 32. To be prepared.	No EA condition
	Risk Management System	EIS Chapter 32 and Appendix 33. To be developed prior to commencement of mining activities.	Condition A9
Chapter 6 Surface water	Receiving Environment Monitoring Program	EIS Chapter 15. AEIS Appendix 5. Report on findings to be prepared annually and made available upon request of administering authority.	Conditions F20–F23
	Receiving Environment Monitoring Program Design Document	To be prepared and made available upon request of administering authority.	Condition F23
Chapter 7 Groundwater management	Groundwater Monitoring Program	EIS Chapter 17. To be prepared.	Conditions E1–E7 (note sub-plan not a condition – only outcomes are conditioned)
Chapter 9 Rehabilitation and decommissioning	Rehabilitation Management Plan/Monitoring Program	EIS Chapter 10. To be prepared within two years of the effective date of the EA.	Conditions H1–H4 (note sub-plan not a condition—only outcomes)
	Final Void Investigation and Residual Void Water Quality Management Study	AEIS Appendix 9. To be prepared during the life of the mine, and at least 6 months prior to final coal processing from each pit.	Conditions H14–H15 (note sub-plans not condition—only outcomes)
	Mine Closure Plan	EIS Chapter 10. To be prepared four years prior to final coal processing.	No EA condition
	Post Closure Management Plan	To be prepared 18 months prior to final coal processing.	No EA condition
Chapter 10 Soils, erosion and sediment management	Erosion and sediment control plan	EIS Chapter 13. AEIS Appendix 10. To be prepared.	Conditions F27–F28
	Topsoil Management Plan	EIS Chapter 13. AEIS Appendix 10. To be prepared.	Condition H5
	Soil Management Plan	EIS Chapter 13. To be prepared.	No EA condition

EM Plan matter and chapter	Relevant sub-plan	EIS/AEIS section and status	Relevant draft EA conditions (Appendix 2 of this report)
Chapter 11 Flora and fauna management	Biodiversity Offset Strategy	EIS Chapter 21. AEIS Appendix 7. To be prepared and submitted to the administering authority	Conditions H16–H17
Chapter 12 Weed and Pest Management	Weed and Pest Management Plan	EIS Chapter 18. To be prepared.	No EA condition
Chapter 13 Air quality and greenhouse gas management	Dust Management Plan/Ambient Dust Monitoring Plan	EIS Chapter 22. To be prepared.	Conditions B1–B2 (note sub-plan not condition—only outcome)
Chapter 14 Noise and vibration management	Blast Monitoring Program	EIS Chapter 24. To be prepared.	Conditions D2, D4
	Noise Monitoring Program	EIS Chapter 24. The noise monitoring program is to be developed if there are noise complaints.	Conditions D1, D3, D5 (note sub-plan not condition—only outcome)
Chapter 16 Waste management	Waste Management Plan	EIS Chapter 26. To be prepared.	Conditions C1–C3 (note sub-plan not condition—only outcome)
	Waste Rock and Spoil Disposal Plan	EIS Chapter 9. To be prepared.	Condition H6
	Irrigation Management Plan	EIS Chapter 26. Prior to the construction of the proposed sewage treatment plant.	Conditions G1–G10 (note sub-plan not condition—only outcome)
Chapter 17 Traffic and transport management	Road Use Management Plan	EIS Chapter 27. To be prepared.	No EA condition
	Updated Road Impact Assessment	EIS Chapter 27. To be prepared 6 months prior to commencement of construction of site access points.	No EA condition
Chapter 18 Cultural heritage management	Cultural Heritage Management Plan	EIS Chapter 28. Prepared in 2011 and lodged with DATISMA.	No EA condition
	Archaeological Assessment Management Strategy	EIS Chapter 29. Undertaken prior to ground disturbing activity. Prepared if a place or item of heritage value is found.	No EA condition

8. Matters of national environmental significance

8.1 Introduction

As described in section 4 of this report, the Byerwen Coal project (the project) is eligible for assessment under the bilateral agreement between the Commonwealth and the Queensland Government. The Coordinator-General has conducted an environmental impact statement (EIS) process that meets the requirements of Commonwealth and Queensland legislation, and this chapter presents the findings of the Coordinator-General's assessment on matters of national environmental significance (MNES).[12]

8.2 Project assessment and approvals

On 14 December 2010, the proponent referred (referral number 2010/5778) the project to the then Commonwealth Minister for Sustainability, Environment, Water, Population and Communities, now the Minister for the Environment, for a determination as to whether the project would constitute a 'controlled action' with respect to potential impacts on MNES under section 75 of the EPBC Act.

The EPBC Act establishes an Australian Government process for assessing environmental impacts and approving proposed actions that are likely to have a significant impact on MNES.

On 13 January 2011, a delegate of the Commonwealth Minister for the Environment determined that the project is a 'controlled action' under the EPBC Act. The relevant controlling provisions under the EPBC Act at that time were:

- sections 18 and 18(a) listed threatened species and communities
- sections 20 and 20(a) listed migratory species.

On 13 March 2013, the proponent requested a variation to the referred project under section 156A of the EPBC Act. The variation involved the removal of the underground mining component of the project, thereby reducing the project disturbance footprint and lessening the impact to MNES. On 12 April 2013, the Commonwealth accepted the variation to the proposed action under section 156B of the EPBC Act.

The EPBC Act was amended in June 2013, to include water resources as a MNES, in relation to coal seam gas and large coal mining developments. The *Environment Protection and Biodiversity Conservation Amendment Act 2013* (EPBC Amendment Act) commenced on 22 June 2013 to allow the impacts of proposed coal seam gas and large coal mining developments on water resources to be comprehensively assessed at a national level.

[12] In accordance with the requirements Schedule 1 of the 'Bilateral agreement between the Commonwealth and the State of Queensland under Section 45 of the *Environment Protection and Biodiversity Conservation Act 1999* relating to environmental assessment', and Part 13 of the State Development and Public Works Organisation Regulation 2010.

On 24 October 2013, the Commonwealth Minister for the Environment decided that water resources would be a controlling provision for the project under item 23 of Schedule 1 of the EPBC Amendment Act. The new controlling provision under the EPBC Act was:

- sections 24D and 24E Protection of water resources from coal seam gas development and large coal mining development.

Under the bilateral agreement (made under section 45 of the EPBC Act), if a controlled action is a 'coordinated project for which an EIS is required' under the SDPWO Act, certain types of projects do not require assessment under Part 8 of the EPBC Act. The agreement enables the EIS to meet the impact assessment requirements of both Commonwealth and Queensland legislation.

The project, as described in the initial advice statement (IAS) (4 February 2011), was the subject of an EIS released for public comment on 8 June 2013. On 16 September 2013, the Coordinator-General sought additional information from the proponent. The additional information on the EIS (AEIS) document was released for advisory agency comment on 29 January 2014.

Under Part 4 of the SDPWO Act and section 36 of the State Development and Public Works Organisation Regulation 2010 (SDPWO Regulation), the Coordinator-General must ensure the assessment report evaluates all relevant impacts that the action has, will have, or is likely to have, and provide enough information about the action and its relevant impacts to allow the Commonwealth Minister for the Environment to make an informed decision whether or not to approve the action under the EPBC Act.

The controlled action may be considered for approval under section 133 of the EPBC Act, once the Minister has received the Coordinator-General's EIS evaluation report (prepared under section 35 of the SDPWO Act).

This section of the report addresses the requirements of the TOR and Queensland Government's assessment as specified by Schedule 1 of the bilateral agreement and Part 13 of the SDPWO Regulation.

8.3 Description of proposed action

The proposed open-cut coal mine is located in the Isaac and Whitsunday Regional Council areas, 20 km west of Glenden and 140 km west of Mackay (refer Figure 8.1). The project area is traversed by the Collinsville-Elphinstone Road and the Newlands Rail System. The project area comprises mining lease applications (MLA) MLA 10355, MLA 10356, MLA 10357, MLA 70434, MLA 70435 and MLA 70436 covering an area of approximately 22 697 ha.

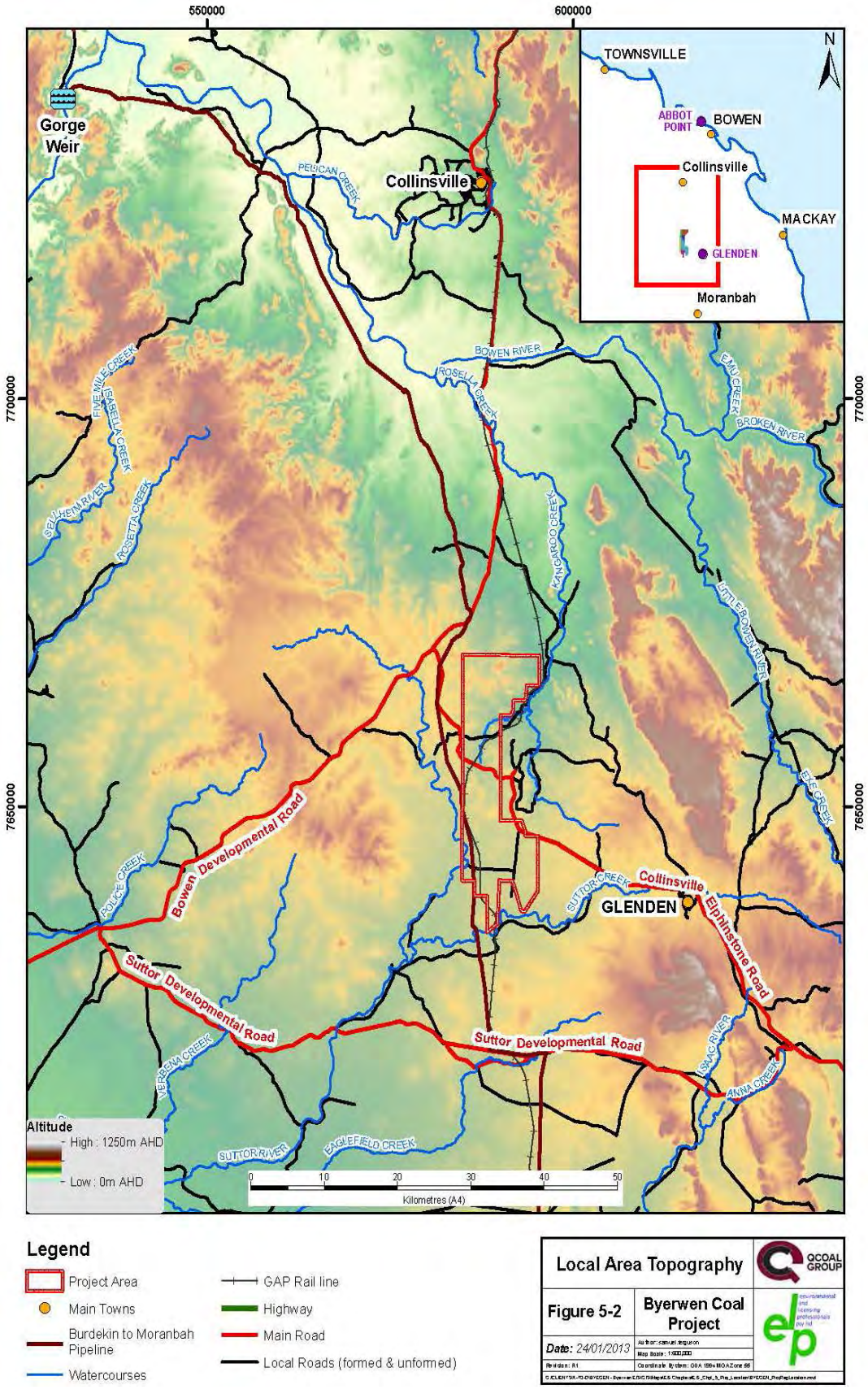


Figure 8.1 Location of mine

The project is expected to produce an average of 15 million tonnes per annum (Mtpa) run-of-mine (ROM) coal to produce 10 Mtpa high-quality washed coking coal for the export market. The project has a 50-year project life comprising two years for construction, 46 years of mining operation and two years for decommissioning and rehabilitation.

Proposed components of the mine development include:

- four mining zones comprising eight open-cut pits
- out-of-pit waste rock dumps adjacent to the mining areas
- coal handling and preparation plants (CHPPs), mine infrastructure areas (MIAs), ROM coal stockpile areas and dump stations
- train loading facilities (TLFs) comprising train loading bin, a 300 m radius rail loop and narrow gauge rail spur
- conveyors to connect product coal pads to TLFs
- ROM coal haul roads, heavy vehicle and light vehicle access roads and rail crossings
- a water management system, water storage infrastructure, and sediment control ponds and co-disposal dams
- power lines and substations for connection to an existing 66 kV power line and portable back-up power generators
- water pipelines connecting to SunWater's Burdekin to Moranbah water supply pipeline system
- a sewage treatment plant
- storage areas for diesel storage, tyres and other materials.

The total area of disturbance as a result of the project's direct footprint from mining and infrastructure areas would be 6998 ha. The remaining project area of 15 699 ha of land would remain undeveloped. The proponent has indicated that a portion of this land is relevant as environmental offsets for MNES (refer section 8.4 of this report).

Construction

Pre-construction

The pre-construction stage involves detailed design, tenders and early procurement of infrastructure components. This stage will start two years before the construction stage and does not involve on-site construction activities or require resource allocation approvals.

Site preparation

Site preparation will include site security, site clearance, civil works, establishment of access roads, laydown areas, storage areas, car park, demountable offices, crib rooms, amenities, sewerage infrastructure, water supply and fencing. Site clearance will include clearance of vegetation, soil removal and storage, bulk earthworks and temporary drainage works. Site preparation will start approximately 1.5 years before

the construction stage focusing on the internal access road, south MIA and CHPP and then be staged on an as needed basis.

Mine facility construction

Construction for the project is proposed to be carried out in two phases known as the southern phase and the northern phase. The southern phase will include:

- site clearance and preparation
- civil works
- structure and plant erection and installation
- construction of mine infrastructure
- commissioning and testing
- materials, plant and equipment sourcing and transportation
- accommodation and transport of construction personnel
- construction of coal haul roads
- construction of the train loading facilities
- construction of ancillary infrastructure such as power and water reticulation systems.

Construction in the northern phase will commence in approximately Year 15 of the southern phase mining operations and will include the same site preparation activities as the southern phase.

Mine operation

Four mining zones have been identified for the project (north, south, east and west), comprising eight open pits. The south phase comprises mining zones in the south, east and west. The north phase comprises mining zones in the north. Mining will be via open-cut using a combination of dragline, large excavator, truck and dozer equipment.

Mining is to commence as soon as construction of the mine facilities has been completed. Mining will commence in the southern tenement area (West Pit 1) adjacent to initial infrastructure. There will be a staged ramp-up of production. Mining activities are proposed 7 days per week, 24 hours per day. The broad mining methodology for each open pit will be:

- vegetation clearing (where required)
- soil stripping and storage or direct spreading
- blasting of the waste rock (where required)
- removal of waste rock by truck, excavator and drag line in box-cuts, creating new mining strips and filling in old/previously mined voids
- possible blasting of coal and excavation of ROM coal by excavator and/or drag line
- hauling of ROM coal to the ROM pad by off-road trucks and then to the CHPPs for washing and processing and train load out
- final landform re-profiling, topsoiling and revegetation activities by earthmoving equipment.

Product coal will be loaded onto trains via TLFs located adjacent to the CHPP. The TLF will comprise rail loop, train loading bin and rail spur. The TLF rail spur will be connected in the project area to the Newlands Rail System. The CHPP rail spur and rail loop for the southern phase will be approximately 7 km in length and the CHPP rail spur and rail loop for the northern phase will be approximately 3.5 km in length. Product coal will be railed to the Port of Abbot Point coal terminal for distribution to international markets.

Relationship with other developments

The proposed action is connected with the off-tenement development of accommodation facilities in Glenden which would be developed by a third party and the subject of a separate approvals process for development approval under the *Sustainable Planning Act 2009* (Qld) for construction and operation.

The project is dependent on the following:

- an allocation of water (4500 ML per annum (MLpa)) from externally sourced water, initially from SunWater's existing Burdekin to Moranbah water pipeline system that traverses the western side of the tenement area. The project proposes to take water from SunWater's proposed Gorge Weir to Byerwen duplicate pipeline when it is constructed
- third party infrastructure to supply electricity (5 MW construction phase and 23 MW operational phase) over the 50-year life of mine
- the existing Newlands Rail System to haul product coal to the Port of Point coal terminal 25 km north of Bowen.

Proposed rail and infrastructure corridors for proposed Galilee Basin coal mines pass through or close to the project area. The Byerwen project is located immediately to the west of Xstrata Coal's Newlands and Wollombi/Suttor Creek mines. An existing haul road corridor from Wollombi/Suttor Creek to the Newlands processing area intersects the project area.

Other projects proposed within 15 km of the project which, if they proceed, may contribute to the combined impacts on MNES include the Newlands Coal Mine Expansion project (immediately east of the project), Sonoma, Suttor Creek, Suttor Creek East and Lancewood Coal projects, North Queensland Gas Project and the Arrow Bowen Pipeline Project.

8.4 Listed threatened species and ecological communities (section 18 & 18A)

This section provides an assessment of listed threatened species and communities and the potential impacts of the project.

In deciding whether or not to approve the proposal under the EPBC Act, and what conditions to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with:

- Australia's obligations under:

  - The Biodiversity Convention
  - The Apia Convention
  - Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan[13] or threat abatement plan.

8.4.1 Recovery plans and threat abatement plans

There are five recovery plans, two proposed recovery plans and five approved conservation advice documents for species that may occur, are likely or known to occur in the project area. There are two threat abatement plans that list species of interest or that may possibly be impacted by the threat, that occur in the project area. The plans are listed below and summarised in Appendix 7 of this report.

- *National Recovery Plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community* (McDonald, 2010)
- *Proposed Brigalow (Acacia harpophylla dominant and co-dominant) Recovery Plan (Butler, 2007)*
- Draft *Recovery Plan for the "Bluegrass (Dichanthium spp.) dominant grasslands of the Brigalow Belt Bioregions (north and south)" endangered ecological community, 2007-2011* (Butler, D.W. 2007)
- *Queensland Brigalow Belt Reptile Recovery Plan 2008-2012* (Richardson 2006)
- *National Recovery Plan for the Black-throated Finch Southern Subspecies* (Black Throated Finch Recovery Team 2007)
- *National Recovery Plan for the Northern Quoll (Dasyurus hallucatus)* (Hill B.M. and Ward S.J., 2010)
- *National Recovery Plan for the Red Goshawk (Erythrotriorchis radiatus)* (Department of Environment and Resource Management 2012)
- *Brigalow (Acacia harpophylla dominant and co-dominant) ecological community Approved Conservation Advice* (Department of the Environment (DE) 2013)
- *Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin Approved Conservation Advice* (DE 2008)
- *Dichanthium queenslandicum (king blue-grass) Approved Conservation Advice* (DE 2013)
- *Geophaps scripta scripta (Squatter Pigeon (southern)) Approved Conservation Advice* (DE 2008)
- *Neochmia ruficauda ruficauda (Star Finch (eastern) Approved Conservation Advice* (DE 2008)

[13] The Australian Government Minister for the Environment may make or adopt and implement recovery plans for threatened fauna, threatened flora (other than conservation dependent species) and threatened ecological communities listed under the EPBC Act. Plans set out the research and management actions necessary to stop the decline of, and support the recovery of, listed threatened species or threatened ecological communities. The aim of a recovery plan is to maximise the long-term survival in the wild of a threatened species or ecological community.

- *Threat Abatement Plan for Predation by Feral Cats* (Department of Environment, Water, Heritage and the Arts 2008)
- *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs* (Department of Environment, Water, Heritage and the Arts 2005).
- *Threat Abatement Plan for Predation by the European Red Fox* (Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008).

8.4.2 Methodology and habitat mapping

The EPBC Act Protected Matters Search Tool on 6 December 2010 identified 19 threatened species and communities as potentially occurring in the project area including 3 threatened ecological communities, 7 species of threatened flora and 9 species of threatened fauna.

Methodology of assessment

A combination of desktop assessments and field surveys was conducted by the proponent to determine existing terrestrial ecological values, including MNES for the project area. Further details of the methodology are provided below.

Desktop searches

A desktop assessment of the ecological values of the study area was undertaken in March 2012 to inform the EIS. A review of Commonwealth and State databases and reports prepared for the project and nearby mines of relevance to the assessment of matters protected under the EPBC Act included:

- EPBC Act—Protected Matters Search Tool
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)—Species Profiles and Threats Database (SPRAT)
- Birds Australia—Bird Atlas Search
- DEHP—Wildlife Online Database
- DEHP (Queensland Herbarium)—HERBRECS specimen database
- DEHP—Regional Ecosystem Mapping
- DEHP—High Value Regrowth Mapping
- DEHP—Essential Habitat Mapping
- DEHP—Regional Ecosystem Description Database (REDD)
- DEHP—Environmentally Sensitive Area (ESA) mapping
- DEHP—Biodiversity Planning Assessment (BPA) for the Brigalow Belt
- DEHP—Wetland Mapping
- DEHP—Watercourse mapping
- Queensland Museum—Data search of records within project area
- Protected Area Estate Mapping

- *Flora and Fauna Assessment of the Exploration Permit Coal 614 project area. A report to QCoal Pty Ltd by the Centre for Environmental Management*, Central Queensland University (CQU) (Wormington et al. 2009)
- *Byerwen Coal Baseline Flora and Fauna Study, a report to QCoal Pty Ltd* by Unidel (Unidel 2011)
- Byerwen Coal 2011 Wet Season Baseline Limnology Survey (NRA 2011)
- EISs for the Ellensfield, Caval Ridge and Daunia coal mine projects.

Survey effort

Field surveys were undertaken between August 2009 and July 2013 to identify and describe vegetation communities and terrestrial flora and fauna values and to ground-truth existing regional ecosystem (RE) mapping for the project area.[14] The type and timing of field surveys contributing to the EIS and the AEIS is detailed in Table 8.1.

Field surveys comprised:

- general surveys to verify 1:100 000 scale RE mapping and to identify and prioritise terrestrial flora values in the project area
- a targeted survey to assess whether native grasslands in the eastern part of the project area met the criteria for the 'Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin' threatened ecological community (Natural grasslands threatened ecological community (TEC))
- targeted surveys to assess populations of the previously undescribed *Kelita uncinella* recorded in the initial surveys by CQU.[15]

Table 8.1 Summary of field surveys relevant to matters of national environmental significance

Survey type	Project area	Wet season survey	Dry season survey
Surveys undertaken for the EIS			
General flora survey (CQU)	EPC 614	30 March – 10 April 2009	3 August 2009
General flora survey	EPC 739	–	14–22 October 2010
Targeted grassland survey	EPC 739	–	2–3 June 2011
Targeted surveys for *Ketlita uncinella*	EPC 739	–	5–30 June 2011 24–29 July 2011
General flora survey	EPC 739 and EPC 614	5–9 March 2012	–
General fauna survey	EPC 614	30 March – 10 April 2009	3–12 August 2009
General fauna survey	EPC 739	–	14–22 October 2010

[14] Surveys were carried out in accordance with the Queensland Herbarium's 'Methodology for the Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland' (Neldner et al. 2005).
[15] *Flora and fauna assessment of the exploration permit coal 614 project area near Glenden, Central Queensland. A report to QCoal Pty Ltd, Centre for Environmental Management*, Central Queensland University, Wormington et al. 2009.

Survey type	Project area	Wet season survey	Dry season survey
General fauna survey	EPC 739	5–9 March 2012	–
Surveys undertaken for the AEIS			
Aquatic ecological surveys	3 sites on the Suttor River	Site S1—May 2012 and December 2012 Site R2 and R4—December 2012	

The locations of the 143 sites assessed are shown in Figure 35-5 of the EIS. Figure 8.2 shows the 13 fauna trapping sites for the baseline fauna surveys and the 22 secondary habitat assessment sites within the representative habitat types surveyed. The aim of the targeted fauna habitat assessments carried out at 22 sites of approximately 100 m × 100 m was to identify micro-habitat features for target fauna species identified through the desktop analysis. Fauna survey methodologies are provided in Appendix 19 of the EIS. Table 8.2 presents a summary of survey effort.

Table 8.2 Number of sites and information collected by site type

Site type	No. of Sites	Information collected
Secondary	16	Secondary 16 Complete species list for 10 × 50 m plot, species structure, assemblage, diversity and abundance, record of general vegetation condition and presence of weed species.
Tertiary	23	Species structure, assemblage, diversity and abundance, record of general vegetation condition and presence of weed species.
Quaternary	77	Species present
Not recorded	27	CQU (2009) notes that survey data was collected from 27 survey sites, but does not describe the level of assessment completed or provide the requisite data sheets. Subsequent floristic survey by Unidel (now AMEC) overcomes this limitation by establishing supplementary sampling sites in the areas assessed by CQU.

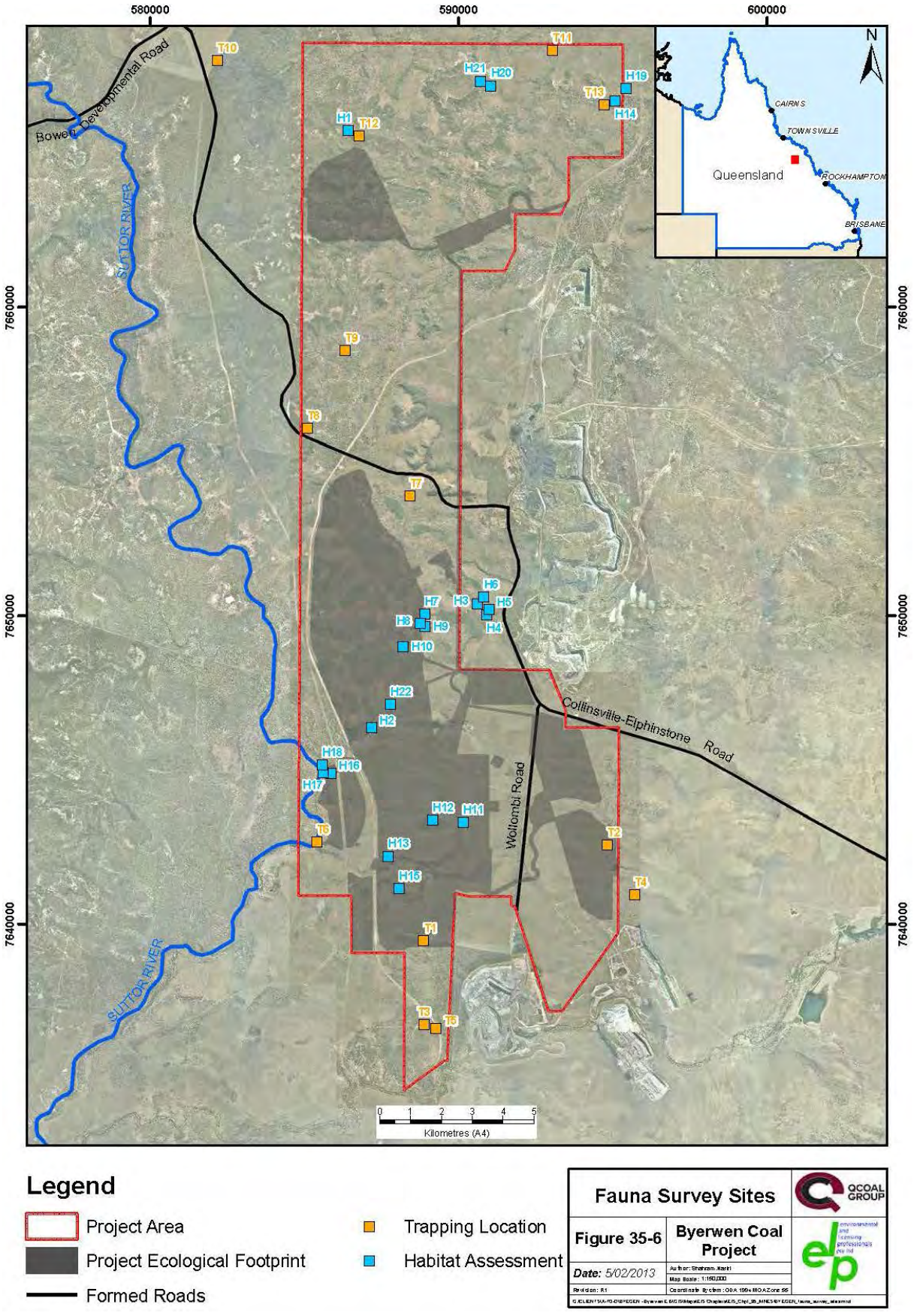


Figure 8.2 Fauna survey sites

Occurrence of MNES

Likelihood of occurrence

The likelihood of occurrence for individual MNES flora and fauna species was undertaken for the EIS. The determination was based on a review of previous records, a review of know habitat preferences and an assessment of habitat availability and the presence of micro-habitat features within the project area, including known RE associations for each species, known records and distribution ranges. Species were then assigned as either 'unlikely to occur', 'may occur', 'likely to occur' or 'known to occur', as follows:

- species considered 'unlikely to occur' were those for which the project area offered limited or no potential habitat, the project area was outside their known range and/or was without broader habitat arrangements
- species that 'may occur' had no known record in the area but the project area contained suitable habitats or suitable RE associations were present
- species determined 'likely to occur' had previously been recorded in proximity to the project area and suitable habitat features were available on site which may support the species
- species or communities listed as 'known to occur' are those which were recorded in the project area for the EIS assessment.

Threatened species and communities not addressed as MNES

The flora species *Digitaria porrecta* (finger panic grass), *Bothriochloa biloba* (lobed blue-grass) and *Hydrocharis dubia* (frogbit) were included in the EIS and assessed as threatened flora species under the EPBC Act by the proponent. These species were removed from the threatened species list under the EPBC Act on 14 December 2013 and there is no requirement to address them as MNES under the EPBC Act in this assessment.

Habitat modelling and impact mapping

Habitat assessments captured specific micro-habitat data from numerous locations within different vegetation groups across the project. This assessment of habitat features identified the presence, abundance and quality of micro-habitat features considered critical for the survival of threatened, near-threatened and regionally significant fauna species. Consideration of habitat quality as a predictor of the likelihood of occurrence is considered to be a precautionary approach.

Certified RE mapping (Version 6.1), current at the time of the surveys, showed 24 REs occur across the project area. Certified RE mapping was verified in the field to confirm the extent and description of vegetation communities in the project area. The proponent revised the RE mapping to reflect the field ground truthing. This revised mapping was used by the proponent as the basis for assessing terrestrial flora values in the project area and has been used in this report and the assessment of project impacts on MNES.

The RE maps are presented in Figure 35-9 and Figure 35-10 of the EIS. The certified RE mapping showed that approximately 12 916 ha, or 57 per cent of the 22 697 ha

project area, supports remnant vegetation. The remaining 9740 ha of the project area is non-remnant or regrowth vegetation comprising mostly cleared grazing land and regrowth vegetation. The proponent's revised RE mapping shows that approximately 11 411 ha (50 per cent of the project area) supports remnant vegetation and approximately 11 211 ha is non-remnant or regrowth vegetation.

A comparison of the areas of the REs in the project area taken from the certified RE mapping and the proponent's revised RE is provided in Table 35-6 of the EIS, together with the REs' description, biodiversity status ('no concern at present', 'of concern', 'endangered') and status under the *Vegetation Management Act 1999* (VM Act) and EPBC Act.

Direct impacts

The direct project disturbance footprint of all project mining and infrastructure areas totals 6998 ha. The total impact footprint considered for the terrestrial ecology impact assessment is approximately 7481 ha, as a buffer area has been added to account for areas that will be isolated or cleared as a result of mining and/or associated infrastructure. The direct footprint area in terms of REs, RE category and TECs is provided in tables 35-12, 35-13 and 35-14 of the EIS.

Development of the project over the 50-year period would result in the loss of approximately 2391.1 ha of remnant native vegetation and 21.4 ha high-value regrowth. The majority of this vegetation would be cleared from the West Pit, North Pit and northern MIA, with smaller areas of clearing associated with the other pits as well as the central infrastructure corridor connecting the northern and southern MIAs.

Vegetation clearing over the life of the project would result in a reduction in the extent of endangered and of-concern vegetation communities and a reduction in the available habitat for fauna, including threatened and migratory species within the project area. The majority of the remnant vegetation to be cleared (1612.8 ha) is classified as 'no concern' at present (by biodiversity status), with the remaining area comprised of 'endangered' (313.9 ha) and 'of concern' (465.2 ha) RE types.

Areas of TECs in the project area and direct impacts on MNES were calculated for the project. The proposed disturbances to MNES are shown in Table 8.3.

Table 8.3 Project disturbance footprint areas with direct impacts on MNES

EPBC community description	EPBC Act status	REs impacted	Direct footprint (ha)	Footprint adopted for impact assessment (revised mapping) (ha)
Brigalow (*Acacia harpophylla*) dominant and co-dominant (note)	Endangered	11.3.1, 11.4.8, 11.4.9, 11.5.16, 11.9.5	307	316.3

EPBC community description	EPBC Act status	REs impacted	Direct footprint (ha)	Footprint adopted for impact assessment (revised mapping) (ha)
Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar bioregions	Endangered	11.8.13	15	18.0
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	Endangered	11.8.11	79	84.4
Not TEC			6609	7063
TOTAL			7010	7481.7

To ensure a limit on disturbance of TECs and the habitat of threatened species, I have recommended a condition in Appendix 3, Schedule 5, Recommendation 13 setting maximum disturbance limits for clearing land that contains primary habitat for the Squatter pigeon (southern) and the Ornamental snake as well as REs containing Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC), Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC) and Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT TEC).

Offsets

As assessment manager under the assessment bilateral agreement, I am bound to uphold the principles and standards established under the EPBC Act for the assessment of MNES. Therefore, my assessment of MNES for this project and recommendations for conditions relating to MNES contained in Appendix 3 of this report are made in accordance with the EPBC Act and in the EPBC Act Environmental Offsets Policy (EOP), October 2012.

My assessment of offsets for the residual impacts on MNES has been conducted in the knowledge that the Queensland Government is developing a single environmental offsets framework to replace five government offset policies. A new Queensland Environmental Offsets Policy[16] will establish the approach to determining an offset obligation and delivery choices.

The new policy will be binding on all Queensland agencies, but is not intended to override the functions or powers of the Coordinator-General in relation to EIS and coordinated project assessment. The discretion that currently extends to the Coordinator-General under the current offsets framework is intended to continue under the new framework. I will determine and approve any State offset conditions that are considered necessary over and above the Australian Government requirements. I will

[16] Queensland Government, *Queensland Environmental Offsets Policy (not in effect),* Department of Environment and Heritage Protection, Brisbane, 2014, viewed 13 May 2014, www.ehp.qld.gov.au/management/environmental-offsets/documents/qld-env-offsets-policy-not-in-effect.pdf

not require any additional offsets for impacts to state significant biodiversity offsets (SSBV) if the Australian Government also requires an offset for the same values. section 5.2 of this report provides further information on how I intend to implement this strategy.

Based on the assessment of impacts on MNES against the *Significant Impact Guidelines – EPBC Act Policy Statement 1.1*, as provided in tables 35-20 to 35-36 of Chapter 35 of the EIS, the proponent concluded that the project has the potential to result in significant residual impacts (post avoidance and mitigation measures) to one threatened species (Ornamental snake) and three TECs (Brigalow, Native Grassland and SEVT ecological communities) listed under the EPBC Act.

The proponent addressed residual impacts on MNES in its offset strategy in section 35.11 of the EIS. Table 8.4 shows predicted residual impact areas for EPBC listed species and communities. The EIS concluded that there are unlikely to be significant residual impacts on listed threatened or migratory species, other than the Ornamental snake. Proposed offsets for the three TECs and the Ornamental snake will however result in offset benefits for other known or likely to occur threatened and migratory species under the EPBC Act that will be impacted by the project. The predicted residual impact areas and offset benefit areas for these species is presented in Table 8.4.

Table 8.4 Predicted residual impact areas for species and communities listed under the EPBC Act

Environmental value	Residual impact area	Offset benefit area
Threatened ecological community		
Brigalow	316.0	
Semi-evergreen vine thickets	18.0	
Natural Grasslands	84.4	
Threatened fauna		
Ornamental snake	395.0	
Squatter pigeon (southern)		10.3
Black-throated finch (southern)		583.6
Australian painted snipe		10.5
Migratory birds		
Eastern great egret		8.7
White-bellied sea-eagle		8.7
Latham's snipe		8.7
Rainbow bee-eater		585.4
Rufous fantail		8.7
Cattle egret		9.7
Fork-tailed swift		585.4
White-throated needletail		585.4

In relation to the quantity of offsets for MNES, I recommend that the area of offsets be calculated for both state and Commonwealth matters using the Herbarium's assessment of the proponent's mapping. I recommend that the certified Herbarium mapping be used for offset calculations, with a provision for the proponent to be able to make an application for an amendment based on the Herbarium's assessment report

In relation to the provision of MNES offsets, I expect the proponent to legally secure land with sufficient offset requirements prior to any project activities that are predicted to adversely impact on any of the species and communities which are to be offset.

8.4.3 Threatened ecological communities

An ecological community is a naturally occurring group of plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, and climate and water availability. An ecological community becomes threatened when it is at risk of extinction.

Three of the EPBC Act listed TECs identified by the desktop assessment as potentially occurring were confirmed as present within the project area. The area of each TEC and its constituent REs is summarised in Table 8.5. The distribution and extent of TECs in the northern and southern project area is shown in Figures 8.3 and 8.4. Clearing to be undertaken prior to establishing open-cut pits and supporting infrastructure will result in an overall reduction in the extent of TECs in the project area.

Table 8.5 Threatened ecological communities and analogous regional ecosystems mapped as occurring within the project area

EPBC community description	EPBC Act status	Equivalent RE area within project area (revised mapping) (ha)
Brigalow (*Acacia harpophylla*) dominant and co-dominant (note)	Endangered	11.3.1 (118) HVR 11.3.1 (36) 11.4.8 (155) 11.4.9 (237) HVR 11.4.9 (18) 11.5.16 (581) 11.9.5 (21) HVR 11.9.5 (6)
Total Brigalow TEC		**1172**
Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar bioregions	Endangered	11.8.13 (345)
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	Endangered	11.8.11 (117)

Note: Estimated areas for Brigalow TEC take into account the regrowth vegetation more than 15 years old which meets the listing requirements for the TEC.

Impacts on MNES were assessed by considering the impacts of 56 current and planned projects within the Brigalow Belt North Bioregion on TECs associated with these projects. The areas of impact from identified projects including this project on TECs and the percentage contribution of this project of the total impact is 6256.3 ha (5.1 per cent) for Brigalow TEC, 6586.3 ha (5.1 per cent) for Natural grasslands TEC and 697.4 ha (2.6 per cent) for SEVT TEC.

Table 35-19 of the EIS shows the areas of impact from identified projects on TECs including the Byerwen project and the percentage of Byerwen project impact within the total combined impact and the bioregion.

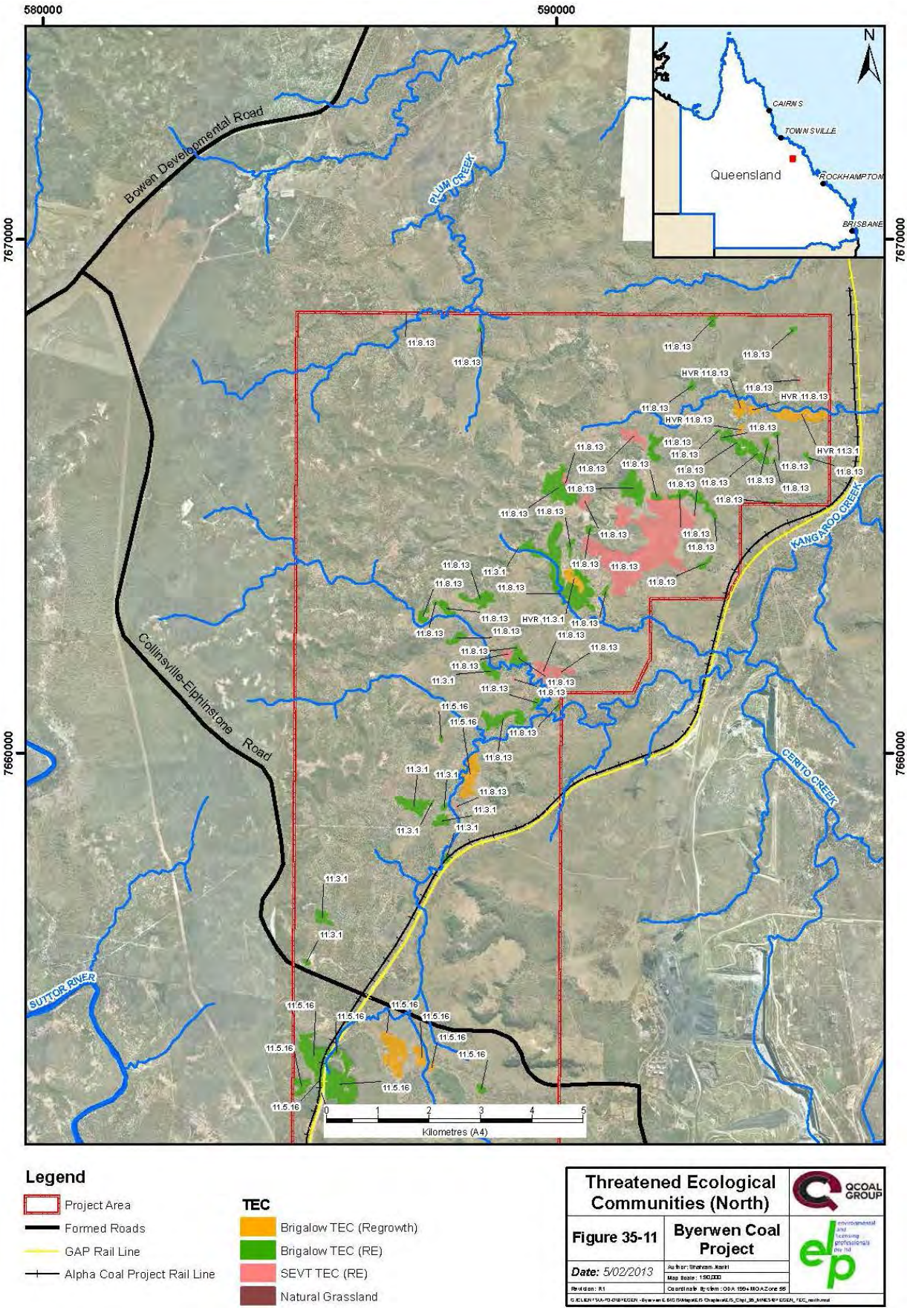


Figure 8.3 Threatened ecological communities (north)

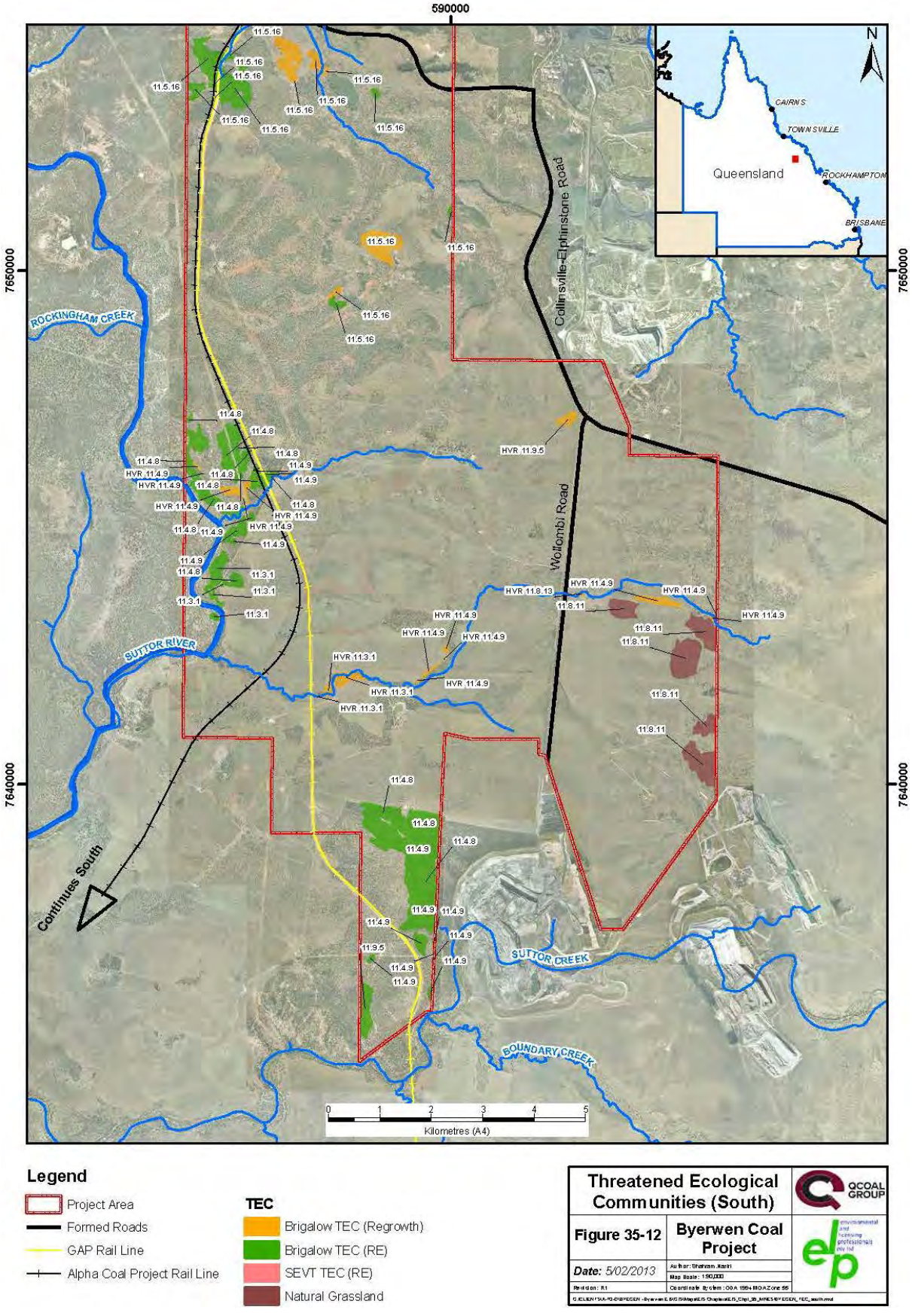


Figure 8.4 Threatened ecological communities (south)

Brigalow

Description

The Brigalow (*Acacia harpophylla dominant and co-dominant*) ecological community was nationally listed under the EPBC Act as endangered on 4 April 2001. This ecological community was listed because it had undergone a severe decline in extent (to approximately 10 per cent of its former area) following extensive clearing in both Queensland and New South Wales for agricultural use. Threats to the remaining Brigalow TEC include factors that may further reduce its extent or cause a decline in condition. Threats and risks include clearing, fire, weeds, feral animals, inappropriate grazing and climate change. Mining in the Bowen Basin continues to threaten significant areas of the Brigalow TEC.[17]

Any activities that further reduce the extent of the Brigalow TEC, will cause a further decline in vegetation condition or impede its recovery are considered the key threats to this TEC. Continued tree clearing, grazing and exotic species are key ongoing threats.

Survey results

The Brigalow TEC occurs as small remnants across the entire project area, with larger tracts of this community located within the central and southern portions of the project area. REs observed within the project area were:

- RE 11.3.1—*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains (118 ha)
- RE 11.4.8—*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains (155 ha)
- RE 11.4.9—*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains (237 ha)
- RE 11.5.16—*Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains/remnant surfaces (581 ha)
- RE 11.9.5—*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks (21 ha).

These REs are assigned a biodiversity status of endangered. RE 11.3.1 occurs as fragmented linear strips along drainage lines or as isolated pockets amongst more extensive flood plain vegetation. Very few intact examples were recorded in the project area. Most areas consisted of established regrowth Brigalow trees, assessed as being greater than 15 years old. Canopy heights were 8 m to 12 m. This extent of regrowth fails to satisfy the VM Act remnant status criteria, however it achieves the criteria for identification as Brigalow TEC. All areas were assessed as heavily impacted by grazing with the presence of declared Class 2 weed species, including: Parthenium (*Parthenium hysterophorus*); Harrisia cactus (*Harrisia martini*); and Prickly pear (*Opuntia stricta*).

[17] Commonwealth of Australia, Approved Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community, Department of the Environment, Canberra, 2013, viewed 13 May 2014, www.environment.gov.au/biodiversity/threatened/communities/pubs/028-conservation-advice.pdf

Areas of RE 11.4.8 were located in the southern part of the project area. Patches in poor condition, due to partial clearing, large canopy gaps and/or the presence of weed species such as prickly pear, were observed along the Suttor River alluvial corridor in the central west portion of the project area. Areas of this RE were observed in a large patch of vegetation in the south-east of the project area. These areas were characterised by a relatively intact canopy and lower abundance of weed species and were considered to be in moderate to good condition.

Areas of RE 11.4.9 were confined to the southern part of the project area fringing the Suttor River and tributaries and along the far south-eastern boundary. Two of these confirmed patches showed evidence of previous disturbance, with regrowth intermixed with intact canopy trees. A third location in the south of the project area exhibited minimal canopy disturbance (canopy cover of 60 per cent) and weed incursion.

RE 11.5.16 was not mapped by DEHP. Field surveys observed this RE in the centre of the project area. The remnants generally comprised regrowth vegetation greater than 15 years of age. Canopy gaps attributable to historic and more recent clearing were evident at sites T2 and T5. Buffel grass (*Cenchrus ciliaris*) formed a dominant ground cover in many areas observed.

RE 11.9.5 was mapped in a single location—west of the Newlands Rail System railway on the far south-west boundary of the project area. This location was outside of the impact area and no site-specific information for this small vegetation unit was collected during field surveys.

Areas mapped as Brigalow High Value Regrowth (HVR) were viewed in aerial imagery and ground truthed to establish whether the regrowth qualified as a Brigalow TEC. Generally, regrowth that has been cleared within the past 15 years would not have regained the structure and species composition typical of remnant Brigalow and therefore does not qualify as the TEC.

A proposal to clear regrowth Brigalow must be approved under the EPBC Act if:

- clearing of the regrowth requires a permit under Queensland legislation (e.g. the regrowth is mapped as HVR)
- the regrowth brigalow is more than 15 years old.

Based on the revised mapping it is estimated that approximately 60 ha, also mapped as HVR in the revised RE map, meets the listing criteria for Brigalow TEC. This regrowth has been included in the revised Brigalow TEC areas in Table 8.5. The revised RE mapping indicates that approximately 1172 ha of Brigalow TEC occurs in the project area.

Project impacts and mitigation measures

Table 35-20 of the EIS provides an assessment of the potential impacts associated with the project on Brigalow TEC against the EPBC Act significant impact criteria for endangered ecological communities. The assessment determined that land clearing for the establishment of open-cut pits and supporting infrastructure associated with the project will result in an reduction of 316 ha in the extent of Brigalow TECs in the project area. This represents 0.1 per cent of the 579 883 ha of Brigalow TEC within the Brigalow Belt North Bioregion. This calculation takes into account the regrowth

vegetation more than 15 years old which meets the listing requirements for the TEC. Approximately 50 per cent of clearing within the Brigalow TEC would result from the loss of small, fragmented patches in the southern part of the project area and clearing along the edge of patches of Brigalow vegetation.

Land clearing impacts on Brigalow TEC in the project area will be reduced by clear delineation of areas of vegetation requiring removal to equipment operators and supervisors before any vegetation clearance commences to ensure disturbance to brigalow is minimised.

Mitigation measures addressing the recovery actions proposed in the recovery plan for the Brigalow endangered ecological community[18] include:

- facilitating the restoration of degraded remnants
- establishing regional benchmarks for habitat condition
- establishing pest management plans for key areas of the ecological community
- establishing and implementing fire reduction plans for key areas of the ecological community.

General mitigation measures have been proposed by the proponent to preserve ecological integrity and address these actions as discussed below.

Open-cut mining activities may result in the altered distribution of cracking clay soils supporting Brigalow. The proponent has indicated that separate stockpiling of soils from these areas for use in rehabilitation and/or offset areas will be considered and a topsoil management plan will be developed (Appendix 6, commitments 184 and 442). I have stated at condition H5 for the draft EA at Appendix 2, Schedule H that a topsoil management plan must be developed and implemented.

I have also stated at conditions H1 and H2 for the draft EA that land disturbed by mining must be rehabilitated in accordance with Table BY1 in Appendix 2. The rehabilitation completion criteria outlined in Table BY1 are to be reviewed five years after the issue date of the EA and every five years until the completion criteria are achieved with a copy submitted to the administering authority for approval. For topsoil stockpiles I have set a completion criterion in Table BY1 for rehabilitated areas to comprise native vegetation so as to achieve an outcome of sustainable land use.

Brigalow communities may be impacted by altered fire regimes in the project area. The proponent has committed to manage vegetation retained on site for fuel load and will put in place appropriate fire regimes to maintain biodiversity values while minimising the risk of bushfire. Fire regimes and management measures are to be documented in a site-specific fire management plan developed by the proponent.

Weeds must be managed to prevent weed invasion and associated habitat degradation and/or increased fire risk. I acknowledge the proponent has committed to control weed species, implement weed management measures, conduct weed monitoring and reporting and prepare a weed and pest management plan to manage pests and weeds during both the construction and operation phases of the project (Appendix 6,

[18] DW Butler, *Brigalow (Acacia-harpophylla dominant and co-dominant) Recovery Plan: Report to the Department of the Environment and Water Resources*, Queensland National Parks and Wildlife Service, Brisbane, 2007.

commitments 27, 82,181 and 390). I have set a completion criterion in Table BY1 for stated condition H1 that any weed infestations are controlled and managed to control or eradicate weed species.

Offsets

An area of 316.3 ha of Brigalow TEC must be offset. The proponent's proposed offset approach is to locate offsets with equivalent REs initially within parts of the project area that are not identified for development. The EIS stated that the proponent and related companies own several pastoral properties in the Brigalow Belt Bioregion and these have been assessed at the desktop level for biodiversity values. These properties will be used subsequent to the project area for offsets. Any MNES that cannot be offset within the project area or on other proponent-related properties will be located on properties within a 150 km radius of the project and within the Brigalow Belt Bioregion.

The proponent's assessment suggests that there is excess suitable land available for use as offsets within a 150 km radius of the project, subject to the outcomes of detailed ecological equivalence assessment.

The EPBC Act EOP is flexible enough to allow offset obligations to be met with similar but not identical composition. The Brigalow TEC contains 16 of the Queensland mapped REs that are dominated by *Acacia harpophylla* (Brigalow). The offset proposed may be for an identical RE to what is impacted or one of the other 15 REs which have been identified as Brigalow. However, the proponent's analysis for offsets for the Brigalow TEC centred on only the equivalent REs as mapped by the Queensland Herbarium that have an endangered-dominant status under the VM Act. The analysis then filtered the potential areas that would also satisfy the habitat requirement for the offset area for the Ornamental snake—that is those potential Brigalow TECs that were on deep-cracking clay soils.

The proponent has indicated that land-based offsets proposed for the project under the EOP will be secured through legally binding mechanisms on the land title that are available at the time under Queensland law to protect the offset. The proponent's preferred legally binding mechanism to secure the offsets is the Voluntary Declaration process as facilitated by the VM Act.

I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a biodiversity offset management plan (BOMP) (Appendix 3, Schedule 5, Recommendation 14) outlining how offsets to address the residual impacts of brigalow will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and areas of brigalow clearance may change. Therefore, I have recommended a condition setting a maximum disturbance area for Brigalow TEC at 316 ha (Appendix 3, Schedule 5, Recommendation 13). Should detailed design result in a reduced area of land clearance for Brigalow, I expect the proponent to detail these changes in the BOMP.

Semi-evergreen vine thickets

Description

Semi-evergreen vine thicket (SEVT) is a form of dry seasonal subtropical rainforest. It occurs in areas with a subtropical, seasonally dry climate on soils of high to medium fertility and is generally characterised by the presence of trees with leaves 2.5–7.5 cm long and the frequent presence of swollen-stemmed 'bottle trees' (*Brachychiton australis, B. rupestris*) typically with an uneven canopy 4–9 m high with mixed evergreen, semi-evergreen and deciduous emergent tree species 9–18 m high. Vines, twining or scrambling plants are prominent. Threats to the SEVT include clearing, fire, weeds, grazing and vertebrate pests.

Survey results

The SEVT of the Brigalow Belt (North and South) and Nandewar Bioregions TEC is shown by the certified RE maps as RE 11.8.13 (SEVT and microphyll vine forest on Cainozoic igneous rocks, lowlands) and RE 11.5.15 (Semi-evergreen vine thicket on Cainozoic sand plains/remnant surface). Flora surveys confirmed the presence of RE 11.8.13, but found RE 11.5.15 to be absent from the project area (Figure 35-9 and Figure 35-10 of the EIS).

The proponent's revised RE mapping significantly reduced the extent of the SEVT TEC in the project area from 1343 ha to 345. The proponent advised that this reduction is mainly due to a revision of the RE classification. The proponent's field survey confirmed that extensive areas mapped as SEVT TEC, such as RE 11.8.3, occur on laterite rather than basaltic scree, and are therefore more appropriately assigned to RE 11.7.1, which is not representative of the SEVT TEC. Areas mapped as RE 11.5.15 were generally found not to exhibit the appropriate landform characteristics to be considered SEVT TEC.

The revised RE mapping shows that the SEVT TEC is restricted to the northern portions of the project area, where it occurs as RE 11.8.13.

Trees and shrubs in areas of confirmed RE 11.8.13 exhibited typical microphyll leaf size characters. Common canopy species encountered were: native acalypha (*Acalypha eremorum*), small-leaved plum (*Planchonella cotinifolia*), dogwood (*Erythroxylum australe*), white croton (*Croton insularis*), python tree (*Gossia bidwillii*), white myrtle (*Drypetes deplanchei*) and native olive (*Notelaea microcarpa*), with emergents of broad-leaved bottle tree (*Brachychiton australis*). Canopy height ranged from 3–7 m with emergent trees reaching heights of 20 m. Small pockets of Brigalow open forest on basalt were also mapped within this community.

SEVT TEC condition varied depending on slope and substrate. Where the community was located on rockier scree slopes, the rock talus was effective in excluding fire and limiting grazing pressure. Native groundcover was evident at these sites. Where the community was located in areas with a developing soil profile there was evidence of both fire and grazing, and of reduced canopy structure and coverage.

The proponent's revised RE mapping shows that 345 ha of this TEC occur within the project area.

Project impacts and mitigation measures

Vegetation clearing for the establishment of open-cut pits and supporting infrastructure associated with the project will result in a reduction of 18 ha in the extent of SEVT TECs in the project area. This represents 0.1 per cent of the 35 606 ha of SEVT TEC within the bioregion.

Open-cut mining activities may alter the distribution of soils supporting the SEVT TEC. The proponent will consider separate stockpiling of soils from these areas for use in rehabilitation and/or offset areas. SEVT communities are also fire sensitive and may be impacted by altered fire regimes in the project area. Management of weeds is required to prevent weed invasion and associated habitat degradation and/or increased fire risk. In particular, management will address:

- edge effects in the areas of SEVT TEC affected by the new rail loop
- measures to prevent the spread of parthenium into adjacent areas of natural grassland TEC in the vicinity of the East Pit 2.

Offsets

An area of 18 ha of SEVT is required to be offset. The offset approach is the same as described for brigalow. The proponent has determined that there is sufficient suitable land available for use as offsets.

I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining how offsets to address the residual impacts of SEVT will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and areas of SEVT clearance may change. Therefore, I have recommended a condition setting a maximum disturbance area for SEVT at 18 ha (Appendix 3, Schedule 5, Recommendation 13). Should detailed design result in a reduced area of land clearance for SEVT, I expect the proponent to detail these changes in the BOMP

Natural grasslands

Description

Grasslands and grassy woodlands are among the most threatened ecosystems in Australia. The major threats to the Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin TEC (Natural Grasslands TEC) have been identified as the conversion of native pastures for grazing, cropping and pasture improvement, introduction of weeds and pest animals, physical destruction as a result of mining activities and the construction of roads and other infrastructure.

Survey results

The Natural Grasslands TEC occurs in eight subregions of the Brigalow Belt Bioregion, including Province 6 (Northern Bowen Basin) in which the project area is located. The Natural Grasslands TEC is typically composed of perennial native grasses. It is found on soils that are fine textured (often cracking clays) derived from either basalt or fine-

grained sedimentary rocks, on flat or gently undulating rises. They occur in areas with relatively high summer rainfall and where the tree canopy is usually absent. If tree cover is present, the projective crown cover is no more than 10 per cent.

The certified RE mapping shows that two REs characteristic of the TEC occur in the project area:

- RE 11.8.11—*Dichanthium sericeum* grassland on Cainozoic igneous rocks
- RE 11.9.3—*Dichanthium spp*., *Astrebla spp*. grassland on fine-grained sedimentary rocks.

The surveys confirmed that the Natural Grasslands TEC was present in the project area, but that RE 11.9.3 was absent, and the extent of RE 11.8.11 at 116 ha was significantly less than the 773 ha of RE 11.8.11 on the certified RE map. The 116 ha of RE 11.8.11 shown on the revised RE map is restricted to the south-eastern corner of the project area.

The areas of RE 11.8.11 were found to be in good condition, with limited visible weed infestation and light grazing pressure. Flora surveys across the northern parts of the project area found that the grassland communities in these areas were dominated by the exotic Indian bluegrass (*Bothriochloa pertusa*) and lacked the necessary indicator species for identification as the Natural Grasslands TEC.

Based on the proponent's revised mapping, 116 ha of the Natural Grasslands TEC occur within the project area.

Project impacts and mitigation measures

Clearing for the establishment of open-cut pits and supporting infrastructure associated with the project will result in a reduction of 84.4 ha in the extent of Natural Grasslands TECs in the project area. This represents 0.2 per cent of the 12 042 ha of Natural Grasslands TEC within the bioregion.

Mitigation measures to be implemented by the proponent to reduce the impacts of clearance of the Natural Grass lands TEC include:

- clearly delineating areas of native vegetation requiring removal to equipment operators and supervisors before any clearance to minimise disturbance
- maintaining retained areas of existing grasslands to assist in providing a source of seed for mine rehabilitation works
- preparing a rehabilitation management plan and mine closure plan which incorporates rehabilitation monitoring and trials
- using native species for rehabilitation wherever possible
- monitoring rehabilitation success including survival of regrowth, trends and monitoring program effectiveness.

Offsets

An area of 79 ha of Natural Grasslands TEC will be directly impacted through land clearance. The proponent has provided a buffer for the impact assessment resulting in an area of 84.4 ha required to be offset. The offset approach is the same as described

for Brigalow. The proponent has determined that there is sufficient suitable land available for use as offsets.

I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining how offsets to address the residual impacts of the Natural Grasslands TEC will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be confirmed and refined during the final design phase of the project and areas of grasslands clearance may change. Therefore, I have recommended a condition setting a maximum disturbance area for Natural Grasslands TEC at 84.4 ha. Should detailed design result in a reduced area of land clearance for Natural Grasslands TEC, I expect the proponent to detail these changes in the BOMP.

8.4.4 Threatened flora

Threatened flora are plants that have been assessed as being at risk of extinction. The EPBC Act lists flora considered to be threatened. No aquatic or terrestrial flora species listed as threatened under the EPBC Act were recorded or are considered 'likely to occur' in the project area. As assessment of those species listed under the EPBC Act that 'may occur' or are 'unlikely to occur' follows.

Of the aquatic flora species known to occur in the Burdekin Basin, salt pipewort (*Eriocaulon carsonii*), is listed as endangered under the EPBC Act. The habitat requirements and an assessment of the likelihood of occurrence for this species is provided in Table 35-8 of the EIS. The species is considered unlikely to occur in the project area. It is restricted to saturated soil adjacent to flowing mound springs and as mound springs are not known to occur within the project area the preferred habitat of salt pipewort is unlikely to be present.

Desktop assessments identified nine threatened terrestrial flora species that have potential to occur in the project area. Habitat requirements and an assessment of the likelihood of occurrence for these species are provided in Table 35-9 of the EIS. Of the nine, four species are assessed as 'may occur' and are discussed below, including king blue grass, blue grass, black ironbox and *Croton magneticus.*

King blue grass (*Dichanthium queenslandicum*) is listed as vulnerable under the EPBC Act. It is an erect perennial grass to 80 cm which is known from Brigalow Belt North and South bioregions. The species inhabits both remnant and non-remnant grasslands. The primary habitat for this species is RE 11.8.11. A single HERBRECS record occurs just outside the eastern boundary of the project area in non-remnant grassland immediately west of the Newlands Coal Mine. Detailed survey of the species' primary habitat (RE 11.8.1) was undertaken without additional specimens being located. The proponent advised that the survey effort was considered sufficient to exclude *D. queenslandicum* as a known occurrence.

Blue grass (*Dichanthium setosum*) is listed as vulnerable under the EPBC Act. It is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The primary

habitat for this species is RE 11.8.11. This species was not recorded within a 20 km radius of the project area. Detailed survey of the species' primary habitat (RE 11.8.11) is considered sufficient to exclude *D. setosum* as a known occurrence.

Croton magneticus is listed as vulnerable under the EPBC Act. It is a deciduous small tree or shrub growing to 5 m. Its distribution ranges from Greenvale to near Collinsville. It inhabits vine thickets on sandstone, acid volcanic or granitic substrates. A single Queensland Herbarium record occurs approximately 10 km north of the project area. This species was not recorded during field surveys but may occur in vine thicket communities in the northern part of the project area.

Black ironbox (*Eucalyptus raveretiana*) is listed as vulnerable under the EPBC Act. It is a tree reaching 30–40 m that is endemic to central coastal and sub coastal Queensland. It occurs along rivers and streams. Its distribution is scattered and it is known from the Suttor River and its upper tributaries; the Bowen and Burdekin rivers. This species was not recorded during field surveys may occur along the Suttor River and tributaries in association with RE 11.3.25.

Vulnerable and endangered terrestrial flora species that were classified as 'unlikely to occur' in the project area include *Acacia ramiflora, mareebenis, Cycas ophiolitica* and *Leucopogon cuspidatus.* The proponent's investigations concluded there are no known records in the vicinity of the project area.

I am satisfied that the desktop assessment and field surveys conducted by the proponent have shown there are no threatened flora species recorded in the project area and no direct impact on species listed under the EPBC Act. I expect the proponent to continue to undertake surveys prior to clearing land for project activities and report the discovery of any threatened flora species.

8.4.5 Threatened fauna

Threatened fauna are those species and subspecies of birds, fish, frogs, insects, mammals, molluscs, crustaceans and reptiles which have been assessed as being at risk of extinction. The EPBC Act lists threatened fauna species and promotes their recovery using conservation advice, recovery plans, threat abatement plans and assessment and approval provisions.

Two terrestrial fauna species listed as threatened under the EPBC Act were recorded during fauna surveys in the project area: the Squatter pigeon (*Geophaps scripta scripta*) and Ornamental snake (*Denisonia maculata*). The Black-throated finch (*Poephila cincta cincta*) was tentatively recorded from two brief sightings made without the aid of binoculars.

Habitat requirements and an assessment of the likelihood of occurrence for terrestrial fauna species listed as threatened under the EPBC Act, identified through the desktop assessment is discussed below.

Table 8.6 provides a summary of impacts associated with the project on potential habitat for threatened fauna species known or likely to occur in the project area based on RE associations (i.e. remnant vegetation) within the project disturbance footprint. It should be noted that these calculations provide an estimate of habitat loss based on broadly suitable habitat only. As such, areas of broadly suitable habitat which have

been identified may not actually be of significance, or therefore require mitigation, when determining impacts on the species in question.

Table 8.6 Impacts on potential habitat for threatened fauna species

Species common name	Species scientific name EPBC Act	EPBC Act status	RE associations within the project area	Area (ha) of remnant vegetation impacted within the project area
Ornamental snake	*Denisonia maculata*	V	11.3.1, 11.3.25, 11.3.4, 11.4.2, 11.4.8, 11.4.9, 11.8.11, 11.8.13, 11.8.4, 11.8.5	E – 123.5 OC – 251.1 NC – 262.9
Squatter pigeon	*Geophaps scripta scripta*	V	11.3.2, 11.3.4, 11.3.25, 11.5.1, 11.7.4, 11.7.6,	OC -10.3 NC – 1037.1
Black-throated finch (southern)	*Poephila cincta cincta*	E	11.3.1, 11.3.2, 11.3.25, 11.3.4, 11.3.27, 11.4.2, 11.4.8, 11.4.9, 11.5.1, 11.5.16, 11.5.3, 11.5.9, 11.8.11, 11.8.13, 11.8.4, 11.8.5	E – 207.9 OC – 160.0 NC – 238.3c
Australian painted snipe	*Rostratula australis*	V, M	11.3.25, 11.3.2, 11.3.27,11.9.5	OC – 8.7

EPBC Act Status: V – Vulnerable, E – Endangered, M - Migratory

Ornamental snake

Description

The Ornamental snake (*Denisonia maculata*) is listed as vulnerable under the EPBC Act. Its habitat requirements are woodlands and open forests containing brigalow (*Acacia harpophylla*), gidgee (*Acacia cambagei*), blackwood (*Acacia argyrodendron*) or coolabah (*Eucalyptus coolabah*) communities or pure grassland associated with gilgais or wetlands. Micro-habitat features include coarse woody debris such as fallen timber as well as rocky areas and deep soil cracks. It is endemic to Queensland and occurs in the Dawson and Fitzroy River drainage system of central coastal Queensland.

During the day, the species shelters under fallen timber, coarse woody debris, rocks, bark and in deep soil cracks on gilgai mounds, particularly during dry periods. At night, the species forages near water, almost exclusively on frogs. The Ornamental snake gives birth to live young with an average litter size of seven offspring.

Survey results

The Ornamental snake was recorded during the 2009 and 2012 surveys from riparian forests associated with the Suttor River floodplain and Brigalow communities in the southern part of the project area. The habitat condition on the site is considered generally poor relative to pre-clearing or remnant condition due to thinning and grazing impacts. The habitat quality for this species is moderate to high and provides important habitat. This species occurred in many disturbed areas, including cleared land with gilgai micro-relief.

A DEHP mapped essential habitat area for the snake occurs on the western boundary of the project area in proximity to the Suttor River (Figure 35-15 of the EIS). This species was not found in proximity to this essential habitat area, but was observed approximately 5 km to the south within an area mapped as RE 11.3.4 located within floodplains of the Suttor River. This site is considered to form part of a faunal corridor that exists along the Suttor River and associated low flow terrace. It is dominated by Queensland blue gum and River red gum. Given both the essential habitat area, based on the prior recordings and the 2012 survey record of this species are located within this riparian corridor, it represents important habitat for this species.

The area in which this species was recorded contained preferred micro-habitat features for this species including a high density of fallen timber and debris, associated with regular flooding events and historical tree felling. The species was recorded under a log that was overturned during active searches. The Ornamental snake was also recorded during the 2009 surveys within a Brigalow community (RE 11.4.9) located in the south of the project area.

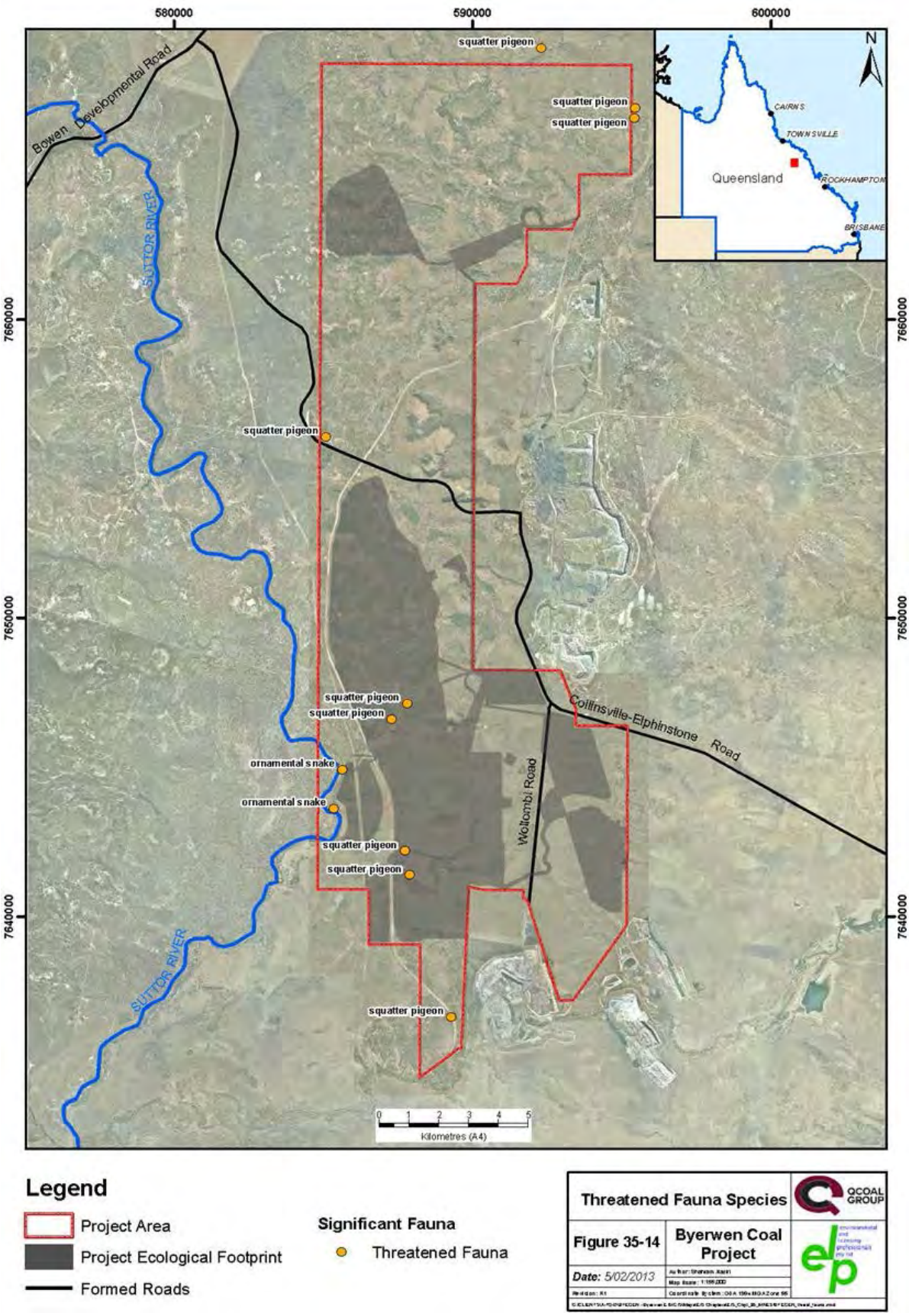


Figure 8.5 **Location of threatened fauna species—ornamental snake and squatter pigeon**

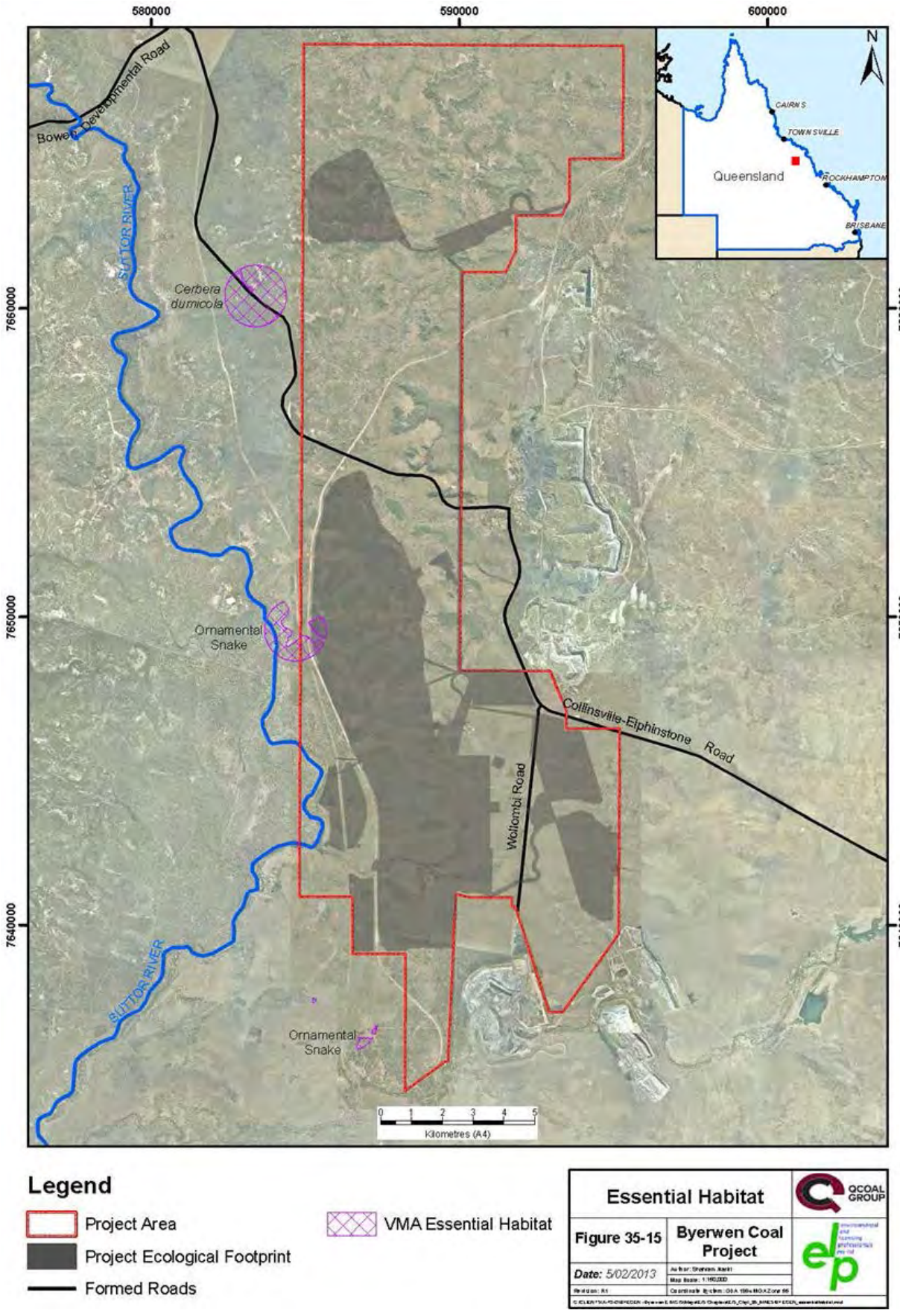


Figure 8.6 Essential habitat of the ornamental snake

Project impacts and mitigation measures

Table 35-23 of the EIS provides an assessment of the potential impacts associated with the project on the Ornamental snake against the EPBC Act significant impact criteria for vulnerable species.

The loss or degradation of riparian habitat surrounding drainage features, dams, wetlands and gilgai, is expected to have the largest impact on the Ornamental snake. The main areas of high value habitat are the lower areas of the clay floodplains containing regenerating Brigalow stands and gilgai located within the footprint of South Pit 2 as well as DEHP mapped essential habitat (refer Figure 8.6) within the waste rock footprint associated with the west pits.

The drainage features within the project area, particularly in the southern half, are also habitat of value for the Ornamental snake. The relocation of the watercourse between West Pit 1 and South Pit 1 and the central infrastructure corridor crossing the watercourse is also expected to impact the Ornamental snake habitat.

The Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles[19], states that clearing two or more hectares of 'important habitat' or altering water quality or quantity affecting four or more hectares of important riparian habitat is classified as a high risk of significant impact on the Ornamental snake and warrants referral to the Commonwealth Minister for the Environment. The project impact meets both these criteria as the location of the Ornamental snake habitat is within a central activity area and there is limited potential for rehabilitation of the disturbed habitat.

Proponent Commitment 187 in Appendix 6 outlines the management measures to protect the Ornamental snake which will focus on minimising the project's impact on riparian vegetation associated with the location of the waste rock dumps within the Suttor River floodplain. Other commitments include maintaining adequate buffers from retained vegetation and scour protection provided for the rock dump to minimise the potential for erosion, sedimentation and associated impacts on water quality, particularly during larger flood events. Project vehicle movements around the dump will be minimised, particularly at night, to reduce the risk of vehicles striking the species and disrupting them with vehicle lighting.

The *Queensland Brigalow Belt Reptile Recovery Plan* (Richardson, 2006)[20] covers 16 threatened reptile species, including the Ornamental snake. Appendix 7 contains a summary of the objectives and actions of the plan. The overall recovery objective of the plan is to secure and improve the long-term survival of the species and their key habitat, and to raise awareness of reptile conservation issues within the community. The proponent will raise awareness of reptile conservation issues by educating construction and operational staff as part of the induction process. Training on fauna avoidance will be provided to all staff, with only nominated and trained staff responsible for fauna handling (Appendix 6, Commitment 188).

---

[19] Commonwealth of Australia, *Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles,* Department of Sustainability, Environment, Water, Population and Communities, Canberra, 2011.
[20] Richardson, R, *Queensland Brigalow Belt reptile recovery plan 2008-2012,* Report to the Department of Environment, Water, Heritage and the Arts, WWF Australia, Brisbane, 2006.

Of the management practices recommended in the recovery plan for the continued survival of reptile species, including the Ornamental snake, the proponent has committed to ensure compliance with the following:

- managing the impact of feral animals
- adaptive fire management.

The proponent has also committed to minimising impacts on habitat by minimising vegetation clearance along drainage features in order to maintain bank stability, habitat connectivity and movement corridors, clearing riparian vegetation in a staged manner to allow fauna, including the Ornamental snake, to migrate to adjacent habitats and having a suitably qualified spotter-catcher available when clearing in habitat areas (Appendix 6, Commitment 170).

Offsets

The proponent proposed to offset an area of potential habitat for the Ornamental snake based on the area of endangered and of-concern REs associated with habitat requirements for the species which will be impacted within the project area. The impact area totals 395 ha as shown in Table 8.7 below.

Table 8.7 Impacts on potential habitat for the ornamental snake and proposed offsets

REs associated with habitat requirements within the project area	RE biodiversity status	Proposed offset area (ha)
11.3.1	Endangered	8.7
HVR 11.3.1	Endangered	11.0
11.3.4	Of Concern	1.6
11.3.25	Of Concern	8.7
11.4.2	Of Concern	156.4
11.4.8	Endangered	34.6
11.4.9	Endangered	62.2
HVR 11.4.9	Endangered	7.6
11.8.11	Of Concern	84.4
11.8.13	Endangered	18.0
HVR 11.9.5	Endangered	1.8
TOTAL		395.0

Searches for potential offset areas by the proponent focused on finding all obligations for each MNES at the highest value impacted. The analysis for the Brigalow TEC centred on only the equivalent REs as mapped by the Queensland Herbarium that have an endangered-dominant status under the VM Act. The analysis then filtered the potential areas that would also satisfy the habitat requirement for the Ornamental snake, that is those potential Brigalow TECs that were on deep-cracking clay soils.

The results of the proponent's assessment for potential offset areas determined that potential offset areas for habitat for the Ornamental snake occur on the

proponent-related properties in the project area. Additionally there are 9700 ha of non-remnant area on the project area that could be assessed if required for habitat.

I am satisfied with the surveys and habitat assessment undertaken by the proponent to determine the impact area for Ornamental snake that requires an offset. I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining how offsets to address the residual impacts of the Ornamental snake habitat will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be further refined during the final design phase of the project and areas of habitat clearance may change. Therefore I have recommended a condition setting a maximum disturbance area for habitat suitable to Ornamental snake at 395 ha. Should detailed design result in a reduced area of land clearance for this habitat, I recommend that the proponent detail these changes in the BOMP.

Squatter pigeon

Description

The Squatter pigeon (southern) (*Geophaps scripta scripta*) is listed as vulnerable under the EPBC Act and Queensland's *Nature Conservation Act 1992* (NC Act). It is observed in open areas of dry eucalypt woodland close to permanent water and in open forest on the inland slopes of the Great Dividing Range. The current population is estimated to be stable at around 40 000 breeding birds.

There is an abundance of suitable available habitat in Central Queensland. It is a ground-dwelling pigeon that forages on insects, ticks, fallen grass seeds, herbs and shrubs. The breeding season generally occurs from late winter through summer. It breeds in a scrape in the ground lined with dry grass. Movement is restricted as this species is ground dwelling and flies to nearby trees only when flushed or for courtship.

The main identified threats to the Squatter pigeon (southern) include habitat degradation and ongoing clearance of habitat for development purposes or farming, grazing of habitat and predation by feral cats (*Felis catus*) and foxes (*Vulpes vulpes*). Priority actions to support the recovery of the subspecies, identified in the approved conservation advice[21] (summarised in Appendix 7 of this report), include implementing the recommendations identified in the *Threat Abatement Plan for Predation by Feral Cats*[22] and the *Threat Abatement Plan for Predation by the European Red Fox*[23] (summarised in Appendix 7 of this report).

Survey results

Squatter pigeons were detected during the 2009, 2010 and 2012 surveys from grassy woodlands in the southern parts of the project area (refer Figure 8.5). This species was

[21] Approved Conservation Advice, *Geophaps scripta scripta* (Squatter Pigeon (southern)) 3 July 2008.
[22] Commonwealth of Australia, *Threat abatement plan for predation by feral cats*, Department of Environment, Water, Heritage and the Arts, Canberra, 2008.
[23] Commonwealth of Australia, *Threat abatement plan for predation by the European red fox*, Department of Environment, Water, Heritage and the Arts, Canberra, 2008.

incidentally recorded in the southern section of the project area in poplar box grassy woodlands in 2009 and at site T8 in 2010 in grassy eucalypt and acacia woodland. In 2010, four individuals were recorded at site T2 and were observed both on the ground and resting on logs. In 2012, the species was observed watering at a small farm dam occurring on sandy plains at site H19. This species utilises a wide range of habitat types and the proponent expects it to have a common presence in the project area. Figure 8.5 shows the location of Squatter pigeon recorded sightings in relation to the project's ecological footprint.

Project impacts and mitigation measures

The proponent's assessment has determined that 1074 ha of remnant vegetation that contains potential habitat for the Squatter pigeon will be cleared or impacted by the project. Of this area 10.3 has a RE biodiversity status 'of concern' and 1037.1 ha is 'no concern at present'.

Table 35-24 of the EIS provides an assessment of the potential impacts associated with the project on the Squatter pigeon against the EPBC Act significant impact criteria for vulnerable species.

Despite its conservation status, this species is widespread in Central Queensland and is expected to occur in grassy woodland habitats in proximity to watering points across the site. Overall habitat quality for this species is moderate to high within remnant vegetation and low in previously cleared lands and regrowth vegetation.

Grassy woodland habitat will be removed from the project area as a result of the establishment of the West Pit and South Pit 1 footprints. This area is likely to represent an overestimate of impacts on habitat for this species, as Squatter pigeon typically occurs in proximity to water. Clearing would result in a localised reduction of breeding and foraging habitat in the southern part of the project area.

The project will result in the removal of permanent water sources associated with the dams at sites H2 and H13. These dams are the only sources of permanent water in the southern part of the project area and are an important resource for wetland birds and other terrestrial fauna species including the Squatter pigeon which was observed near site H2. Removal of these dams represents the loss of a habitat resource for the species. Other potentially permanent water sources identified using aerial photography are located approximately 6.5 km to the north-west, adjacent to the Suttor River and 6 km to the south-west.

There is also a risk of mortality to both adult birds and young due to project vehicles striking them as this species is ground-dwelling, slow moving and subject to vehicle strike. The proponent has committed to undertake clearing in proximity to water outside of breeding times, with fauna spotter-catchers employed to search for nests and/or stir up birds ahead of clearing works outside these times (Appendix 6, Commitment 190). Speed limits will be imposed on haul roads close to watering points during the construction and early operational phases of the project prior to the removal of suitable habitat from within the project disturbance footprint (Appendix 6, Commitment 191).

Other mitigation measures committed to by the proponent to mitigate impacts on fauna which would benefit the Squatter pigeon include:

- minimising vegetation clearance along drainage features to maintain bank stability, habitat connectivity and movement corridors for fauna species and a habitat refuge for fauna seeking shelter and water
- clearing riparian vegetation in a staged manner to allow fauna to migrate to adjacent habitats
- progressively rehabilitating mined areas to incorporate the provision of nest hollows and micro-habitat features such as trees and logs (Appendix 6, Commitment 170).

Offsets

The proponent concluded that there are likely to be significant residual impacts on the Squatter pigeon, however the offset requirements are already addressed by offsets proposed for the TECs. These offsets will result in offset benefits for the Squatter pigeon by an estimated 10 ha.

I am satisfied with the surveys and habitat assessment undertaken by the proponent to determine the impact area for Squatter pigeon that requires an offset. I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining how offsets to address the residual impacts of the Squatter pigeon habitat will be managed, monitored and legally secured.

I acknowledge that the impacts of the project will be further refined during the final design phase of the project and areas of habitat clearance may change. Therefore I have recommended a condition setting a maximum disturbance area for remnant vegetation habitat suitable to Squatter pigeon as 1047 ha. Should detailed design result in a reduced area of land clearance for this habitat, I recommend that the proponent to detail these changes in the BOMP.

Black-throated finch

Description

The southern subspecies of the Black-throated finch (*Poephila cincta cincta)* (BTF) is listed as ‘endangered’ under the EPBC Act and ‘vulnerable’ under the Queensland NC Act.

Its habitat requirements are riparian areas within open eucalypt, acacia or melaleuca forest and woodlands and occasionally tussock grasslands. The BTF occurs in the Townsville region and at scattered sites in central-eastern Queensland. The species requires a mosaic of different habitats in which it can feed on fallen grass seed and obtain water daily. REs in which this species has been recorded within the Brigalow Belt North Bioregion include REs 11.3.12, 11.3.25b, 11.3.27, 11.3.30, 11.3.35 and 11.11.19 according to the National recovery plan for the BTF.

The Significant Impact Guidelines for the BTF note that the BTF requires access to three key habitat resources, being water sources, grass seeds and trees providing suitable nesting habitat. The presence and configuration between and within these three key resources governs the distribution of the BTF. Any disruption to the connectivity between these resources will have a serious impact on an area’s ability to sustain BTF populations. While suitable nesting sites are likely to be relatively common

in the landscape, the distribution and availability of water and foraging habitat is much more limited and will, in turn, limit the number of nesting sites available to the BTF.

BTF can breed all year with peak breeding activity in February and May. They nest in loose colonies in trees and shrubs. The movement patterns on this species are poorly understood, however the finch may undertake some movements in response to rainfall or drought prompted by food availability.

Survey effort and results

This species was targeted during the survey with repeat visits to dams and wetlands with the goal of recording the species coming in to water. Two individual birds suspected to be the BTF were observed during baseline surveys in proximity to the large wetland at site H2 in the south-west of the project area. As there are no previous records of this species in or near the project area, it is thought that these individuals may have dispersed along the Suttor River following consecutive years of high summer rainfall.

The birds were not viewed through binoculars and were sighted for a short period of time without a positive identification. The BTF (southern) may be confused with the Chestnut-breasted mannikin (*Lonchura castaneothorax*) in particular, which is common along the north-east coast of Australia and from which it cannot be distinguished without close examination. As such, the presence of this species has not been confirmed. For the purpose of this assessment, a precautionary approach has been adopted and it is assumed that the species observed is the threatened southern sub-species, so the species is considered as a likely occurrence.

Given this species preference to riparian habitats it is considered that it may travel along the Suttor River riparian corridor which is located approximately 2 km to the south-west of where this species was observed. The proponent concluded that this species would be a rare vagrant to the project area and may have dispersed into this area following a number of wet seasons resulting in suitable water and seed supply.

Project impacts and mitigation measures

The main impact on the BTF is potentially the removal or degradation of riparian habitat. The removal of dams located at site H2 and H13 within the footprint of West Pit 1 and South Pit 1, respectively, is expected to have the largest effect on BTF in terms of habitat loss as these sites afford high value wetlands fringed by eucalypt species and Brigalow adjacent to pastoral grasslands. The Suttor River riparian corridor is also considered to afford breeding and foraging habitat for the BTF. The proponent has committed to mitigating the impacts on this species by conducting detailed searches of nesting habitat within proximity to the Suttor River riparian corridor and the dam at site H2 as well as replicating suitable habitats where possible (Appendix 6, Commitment 192).

The overall objective of the national recovery plan for the BTF (southern subspecies), discussed further below and in Appendix 7, is to manage and protect the BTF and its habitat, and to promote the recovery of the southern subspecies. Guidelines for habitat management for the BTF southern subspecies outlined in the recovery plan include:

- management practices aimed at minimising impacts on habitat by domestic stock and rabbits
- fire management
- weed management strategies to minimise invasion of habitat by exotic weed species, including exotic grasses.

The proponent has numerous commitments (Appendix 6, commitments 27, 114, 180, 181, 182, 186 and 386) that address these guidelines. The proponent has also committed to implement mitigation and management actions consistent with relevant recovery, conservation and action plans (Commitment 388).

The key State legislation for the conservation and recovery of the BTF in Queensland is the NC Act, including the Nature Conservation Regulation 1994.

The NC Act facilitates threatened species conservation through:

- listing vulnerable and endangered species
- requiring permits for the taking of vulnerable and endangered species
- preparation of conservation plans for species or groups of species
- management of wildlife in accordance with the declared management intent for vulnerable and endangered fauna.

Conservation advice, recovery plans and threat abatement plans

National Recovery Plan for the BTF (southern subspecies)

The National Recovery Plan for the BTF[24] (the plan) lists possible threats to the species as clearing and fragmentation of woodland, riverside habitats and wattle shrub land; degradation of habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability; and alteration of habitat by changes in fire regime; invasion of habitat by exotic weed species, including exotic grasses; illegal trapping of birds; predation by introduced predators; and hybridisation with escapees of the northern subspecies. Appendix 7 contains a summary of the plan's actions to protect and enhance existing habitat, understand the importance of threats and verify the subspecies decline.

The plan identifies that proper management of habitat for the BTF is critical to the survival of the species, including managing overgrazing, clearing and fragmentation appropriately and implementing suitable fire and weed management strategies. As noted above, the proponent has committed to a number of these measures, to be implemented through the pest and weed management plan, fire management plan and a bushfire management plan.

[24] See www.environment.gov.au/resource/national-recovery-plan-black-throated-finch-southern-subspecies-poephila-cincta-cincta

Threat abatement plans

The threat abatement plan (TAP) to reduce the impacts on northern Australia's biodiversity by the five listed grasses[25] (grasses TAP) is relevant to the BTF.

The grasses TAP has been developed to address threatening processes of ecosystem degradation, habitat loss and species decline due to introduced Gamba grass (*Andropogon gayanus*), Para grass (*Urochloa mutica*), Olive hymenachne (*Hymenachne amplexicaulis*), and Mission grass (*Cenchrus pedicellatus* syn. *Pennisetum pediccellatum*). It provides a framework for prioritising investment in threat abatement and identifies management and other actions required to ensure the long-term survival of native species and ecological communities affected by these grasses.

The goal of the grasses TAP is to minimise the adverse impacts of the introduced grasses on affected native species and ecological communities. To address this TAP the proponent has committed to develop and implement a weed and pest management plan (Appendix 6, Commitment 386) which specifically addresses measures to prevent the spread of introduced grasses.

Offsets

The proponent concluded that there is not likely to be a significant impact on the BTF. The offset requirements for the TECs for this project will result in offset benefits for the BTF by an estimated 583 ha.

I am satisfied with the surveys and habitat assessment undertaken by the proponent to determine the impact area for BTF. I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining the offsets to address the residual impacts of three TECs which contain suitable habitat for the BTF.

I acknowledge that the sighting of the BTF during the field surveys was not confirmed. Therefore, I recommend that the proponent implement measures to allow identification of the species on the project site over the life of the mine or until the species is delisted from the EPBC Act and submit any recorded sightings to the relevant agency.

Australian painted snipe

Description

Australian painted snipe (*Rostratula australis*) is listed as vulnerable under the EPBC Act. It is also listed as a migratory species under the EPBC Act. It inhabits and forages in ephemeral and permanent shallow freshwater wetlands and inundated grasslands, and the artificial habitats of sewage ponds and dams. This species has a scattered distribution throughout Queensland and south-eastern Australia but has also been recorded less frequently in Tasmania, South Australia, the Northern Territory and Western Australia. This species inhabits inland and coastal shallow freshwater ephemeral and permanent wetlands.

[25] See www.environment.gov.au/resource/threat-abatement-plan-reduce-impacts-northern-australias-biodiversity-five-listed-grasses

The Australian painted snipe nests on the ground among tall vegetation, in a scrape in the ground lined with grass and leaves. It breeds from September to December. Some individuals are apparently resident while others appear to be nomadic, temporarily occupying areas where suitable habitat exists.

Survey results

This species was not observed during the field surveys. It has been previously recorded within 100 km. The species is unlikely to be resident in the project area however, it is likely to occur as a rare vagrant. Potential habitat for this species within the project area includes the large dam at site H2 located to the south-west and the ephemeral gilgai wetlands which occur in the south.

Project impacts and mitigation measures

Table 35-26 in the EIS provides an assessment of the potential impacts associated with the project on the Australian painted snipe against the EPBC Act significant impact criteria for vulnerable species and Table 35-32 of the EIS against the EPBC Act significant impact criteria for migratory species. Neither assessment concluded that the species was significantly impacted against the criteria.

The removal or degradation of ephemeral water bodies is likely to have the largest effect on the Australian painted snipe. High-value habitat includes the large wetland associated with the dam at H2 and the dam at H13 which are both located within the footprints of West Pit 1 and South Pit 1. The creek diversion and crossings between South Pit 1 and South Pit 2 and south of the northern infrastructure area are also likely to affect the habitat for these species. An estimate of 8.7 ha of habitat will be cleared in the project disturbance footprint. This estimate of habitat loss is based on broadly suitable habitat only.

The dam at H19 and the riparian areas along the Suttor River are located outside the development footprint and no impacts on these areas are expected to result from the project. Impacts on the Latham's snipe and Australian painted snipe will be mitigated by the proponent's commitment to have a suitably qualified spotter catcher available when clearing in habitat areas. These species may also benefit from the generation of foraging opportunities associated with the creation of new dams and cleared areas.

Offsets

The proponent concluded that there is not likely to be a significant impacts on the Australian painted snipe. The offset requirements for the TECs for this project will result in offset benefits for the species by an estimated 10.5 ha.

I am satisfied with the surveys and habitat assessment undertaken by the proponent to determine the impact area for the species. I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5, Recommendation 14) outlining the offsets to address the residual impacts of three TECs which contain suitable habitat for the Australian painted snipe.

Refer to the provision of suitable habitat associated with offset benefits for the species as discussed in Section 35.11.2.3 of the EIS.

Listed species that may occur

The proponent's investigations concluded that the Red goshawk, Mount Cooper striped lerista, Yakka skink, Star finch , Northern quoll, Koala, and the South-eastern long-eared bat are species that may occur in the project area. Following is a brief discussion on each.

The Red goshawk (*Erythrotriorchis radiatus*) is listed as vulnerable under the EPBC Act. It was not detected during the survey however eucalypt forest and woodlands adjacent to the Suttor River and the south-west of the project area contain foraging and potentially breeding habitat. Refer Recovery Plans for Northern Quoll and Red goshawk in Appendix 7 of this report.

The former Queensland Department of Environment and Resource Management developed a 'Conservation Management Profile' for the Red goshawk. The profile provides management guidance on minimising identified threats in relation to land clearing and vegetation management, using buffers to protect nest sites, managing nest disturbance, and managing fire and grazing.

Mount Cooper striped lerista (*Lerista vittata*), a skink, is listed as endangered under the EPBC Act. It was not detected during fauna surveys, however lower quality habitat in RE 11.5.9 and SEVT vegetation areas exists in the north-west section of the project area. Its preferred habitat is woodlands dominated by Ironbark (*Eucalyptus crebra* and *E. melanophloia*) and Bloodwood (*Corymbia clarksoniana* and *C. intermedia*) with shrub and/or grassy ground layers on deep red earths, undulating plains and steep hills on granitic rocks as well as SEVT which extends onto areas of ironstone (duricrust) and spinifex communities.

The Yakka skink (*Egernia rugosa*) is listed as vulnerable under the EPBC Act. This species was not detected during fauna surveys but habitat may be suitable within remnant vegetation on the uplifts and escarpments in the north-western parts of the site within areas that have dense ground cover and fallen hollow logs. Its habitat requirements are dense ground cover and abundant course woody debris (hollow logs) or rock in a variety of vegetation types including Poplar box (*Eucalyptus populnea*), Ironbark, Brigalow (*Acacia harpophylla*), Cypress pine (*Callitris glaucophylla*), mulga (*A. aneura*), Bendee (*A. catenulata*) Lancewood (*A. shirleyi*) woodlands and open forests.

Star finch (*Neochmia ruficauda ruficauda)* is listed as endangered under the EPBC Act. It inhabits damp grasslands, sedgelands or grassy woodlands near permanent water or regularly inundated areas. It was not recorded during field surveys, nor are there records in proximity to the project area. Poplar box/blue gum woodlands associated with the Suttor River may represent potential habitat for this species.

Northern quoll (*Dasyurus hallucatus)* is listed as endangered under the EPBC Act. It inhabits forest or woodland with rocky areas and complex vegetation structure in a variety of vegetation types including: eucalypt forest and woodlands, rainforests, sandy lowlands, shrub lands and grasslands. While it was not recorded in the project area, it is still possible that this species may utilise the area undetected.

Koala (*Phascolarctos cinereus)* is listed as vulnerable under the EPBC Act. Its preferred habitat is eucalyptus-dominated temperate, sub-tropical and tropical forest,

woodland and semi-arid habitats. No koala observations were recorded during the fauna survey nor were past records identified from Wildlife Online or the Queensland Museum within 20 km of the project area. Eucalyptus woodland in riparian corridor (RE 11.3.25) in the south-eastern part of the project area may afford habitat, however, should this species occur within the project area, abundance would be expected to be low.

A recovery plan for the koala is to be developed by the Australian Government and is to commence following the expiration of the National Koala Conservation and Management Strategy in 2014. This recovery plan will be for those populations covered by the national threatened species listing. There is currently a suite of planning instruments, policies and guidelines that protect koalas and their habitat.[26]

South-eastern long-eared bat **(***Nyctophilus corbeni*) is listed as vulnerable under the EPBC Act. The preferred habitat of the bat is inland woodland vegetation dominated by eucalypt and bloodwood species as well as box, ironbark and cypress pine woodlands. Loose bark, fissures and hollows on trees afford roosting habitat. This species was not recorded during the fauna surveys, however potentially suitable habitat occurs in woodland vegetation dominated by eucalypt and bloodwood species as well as box, ironbark and cypress pine woodlands. Loose bark, fissures and hollows on trees afford roosting habitat.

The three listed species determined as unlikely to occur in the project area are the Brigalow scaly-foot (*Paradelma orientalis)* and *S*tripe-tailed delma (*Delma labialis*), both listed as vulnerable under the EPBC Act, and Retro slider (*Lerista allanae),* listed as endangered under the EPBC Act. There is an Approved Conservation Advice for *Lerista allanae* and this advice should be taken into account if the species is found on site during construction/operations.

The EPBC Act listed threatened fauna species discussed above that may occur or is considered unlikely to occur in the project area are not considered further in my assessment as they are unlikely to be affected by the project.

Coordinator-General's conclusion—listed threatened species and ecological communities

I have concluded that significant adverse residual impacts are likely on MNES for:

- threatened ecological communities:
  - Brigalow (*Acacia harpophylla*) dominant and co-dominant
  - SEVT of the Brigalow Belt (north and south) and Nandewar Bioregions
  - Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin
- threatened species:
  - Ornamental snake (*Denisonia maculata*).

I have recommended a condition of approval to the Commonwealth Minister for the Environment for the development of a BOMP (Appendix 3, Schedule 5,

[26] Koala policy and guidelines available at: www.ehp.qld.gov.au/wildlife/koalas/legislation/index.html#koala_sensitive_design_guideline_a

Recommendation 14) outlining how offsets to address the residual impacts of the project on these three TECs and one threatened species will be managed, monitored and legally secured.

8.5 Listed migratory species (sections 20 & 20A)

In deciding whether or not to approve the proposal for the purpose of section 20 or 20A of the EPBC Act, and what conditions to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the following conventions and agreements:

- The Bonn Convention
- CAMBA
- JAMBA
- an international agreement approved under subsection 209(4) of the EPBC Act.

Many animals migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. Many migratory species listed under international conventions and agreements that Australia is party to, are protected under the EPBC Act. These species include migratory birds. Many migratory birds use the same habitat areas, and therefore would be similarly impacted if the shared habitat were to be cleared or degraded. Impacts to migratory birds are therefore discussed together below.

Migratory birds

Table 35-11 in the EIS contains details of the description, habitat and likelihood of occurrence for each migratory bird listed for the project area.

Species known to occur

Five species listed as migratory under the EPBC Act were recorded during fauna surveys in the project area: the Eastern great egret (*Ardea modesta),* White-bellied sea-eagle (*Haliaeetus leucogaster*), Latham's snipe (*Gallinago hardwickii*), Rainbow bee-eater (*Merops ornatus*) and Rufous fantail (*Rhipidura rufifrons*). A further five species are likely to occur in habitats within the project area including the Cattle egret (*Ardea ibis*), Fork-tailed swift (*Apus pacificus*), White-throated needletail (*Hirundapus caudacutus*), Australian painted snipe (*Rostratula australis*), and Satin flycatcher (*Myiagra cyanoleuca*).

A number of migratory species were recorded using farm dams and wetland areas in the project area, which are considered to provide the most suitable habitat. Inundated gilgai areas are also expected to provide temporary wetland habitats for migratory species, in particular species such as the Latham's snipe and the Australian painted snipe.

Habitat requirements and an assessment of the likelihood of occurrence for migratory species identified through the desktop assessment are provided in Table 35-11 of the EIS. The location of migratory species records in the project area are shown in Figure

35-16 of the EIS. Overall the habitat values for migratory species are limited and of low value.

Migratory birds not addressed as MNES

The Australian cotton pygmy-goose (*Nettapus coromandeliance albipennis*) and Black-faced monarch (*Monarcha melanopsis*) were identified as part of the desktop assessment through the DE Protected Matters Report (generated in December 2010) as migratory species potentially occurring in the project area. These species were delisted as migratory species since the DE Protected Matters Report was generated so there is no requirement to address them as MNES under the EPBC Act in this or any assessment.

Project impacts on potential habitat

Vegetation clearing over the life of the project will reduce available habitat for migratory species with the loss of 2391 ha of remnant native vegetation and 21.4 ha high value regrowth. Of this total 313 ha is classified as endangered and 465 ha of-concern RE types. The effects of land clearance on migratory birds will include loss of vegetation communities for foraging and breeding, reduced species abundance and biodiversity, loss of connectivity between habitat areas, removal of riparian vegetation associated with Suttor Creek and removal of permanent water sources associated with the wetland habitat and the dams at site H2 and H13.

Table 8.8 provides a summary of impacts on potential habitat for migratory species known or likely to occur in the project area, based on RE associations (i.e. remnant vegetation) within the project disturbance footprint. It should be noted that these calculations provide an estimate of habitat loss based on broadly suitable habitat only. Areas of broadly suitable habitat which have been identified may not actually be of significance, or require mitigation.

Table 8.8 Impacts on potential habitat for migratory species

Common name	Scientific name	RE associations within the project area	Area (ha) of remnant vegetation impacted within the project area
Eastern great egret	Ardea modesta	11.3.2, 11.3.25, 11.3.27	OC –8.7
White-bellied sea eagle	Haliaeetus leucogaster	11.3.25, 11.3.27	OC – 8.7
Latham's snipe	Gallinago hardwickii	11.3.25, 11.3.27	OC – 8.7
Rainbow bee-eater	Merops ornatus	Aerial foraging over all RE types	E – 313.9 OC – 465.2 NC – 1612.0
Rufous fantail	Rhipidura rufifrons	11.3.25, 11.3.27, 11.9.5	OC – 8.7
Australian painted snipe	Rostratula australis	11.3.25, 11.3.2, 11.3.27, 11.9.5	OC – 8.7
Cattle egret	Ardea ibis	11.3.2, 11.3.25, 11.3.27	OC – 8.7

Common name	Scientific name	RE associations within the project area	Area (ha) of remnant vegetation impacted within the project area
Fork-tailed swift	Apus pacificus	Aerial foraging over all RE types	E – 313.9 OC – 465.2 NC – 1,612.0
White-throated needletail	Hirundapus caudacutus	Aerial foraging over all RE types	E – 313.9 OC – 465.2 NC – 1,612.0
Satin flycatcher	Myiagra cyanoleuca	Riparian forest adjoining the Suttor River	0

Area calculation based on RE biodiversity status: E - Endangered, OC - Of concern, NC - No concern at present

Migratory birds have the potential to be influenced by noise from the project as background levels of incidental noise will increase once the mine commences operation. Noise impacts may interfere with communication within species however some migratory species that have landed in the area previously may have become more tolerant of mining-related noise emissions given the proximity to Newlands Mine to the east. The EIS concluded that the impact on fauna is not expected to be significant outside of the immediate vicinity of mining operations with blasting restricted to daylight hours to minimise impacts on the breeding and feeding behaviour of nocturnal animals and birds.

Individual migratory bird species are evaluated below.

Eastern great egret

The Eastern great egret is a widespread species of southern and eastern Asia and Australasia. Breeding populations are located in Pakistan, India, Sri Lanka, Bangladesh, Burma, Thailand, China, Korea, north-eastern Russia, Japan, Indo-China, Indonesia, Papua New Guinea, Solomon Islands, Australia and New Zealand. In Australia, the breeding season of the eastern great egret is variable, depending to some extent on rainfall, but generally extends from November to April, with pairs at southern latitudes breeding in spring and summer (particularly November and December) and pairs at more northerly latitudes breeding in summer and autumn.

Project impact and mitigation measures

Removing or degrading permanent and/or ephemeral wetlands is likely to have the largest effect on the eastern great egret. Gilgai, inundated flood plains, dam sites and water courses, particularly those concentrated in the south-western section of the project area, afford foraging habitat for this species. The large wetland associated with the dam at H2 and the dam at H13 are located within the footprints of West Pit 1 and South Pit 1, however the dam at H19 and the riparian areas along the Suttor River are located outside the development footprint and are likely to experience little disturbance.

The proponent has committed to manage the waste rock pile located west of South Pit 1 to reduce the probability of habitat degradation within the Suttor River riparian areas.

Disturbance to other drainage features such as the creek diversions between South Pit 1 and 2 and the central infrastructure corridor creek crossings approaching the Northern Infrastructure Area are not expected to affect the eastern great egret as this species is highly mobile and capable of relocating with changes in the availability of suitable wetland habitat. As this species breeds in colonies in the northern parts of Australia, no disturbance to breeding habitat is expected as a result of this project.

White-bellied sea-eagle

The White-bellied sea-eagle is distributed from India and Sri Lanka, east to southern China, and south through South-East Asia, the Philippines, Wallacea[27] and New Guinea (including the Bismarck Archipelago) to Australia. The White-bellied sea-eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The inland limits of the species are most restricted in south-central and south-western Australia, where it is confined to a narrow band along the coast.

The breeding season extends from June to January, or sometimes February, in southern Australia, but begins one or two months earlier in northern Australia. Pairs usually return to the same breeding territory each year, and often the same nest, although territories tend to contain one or two additional, less developed nests.

Project impact and mitigation measures

The White-bellied sea-eagle is generally associated with coastal environments and large, inland bodies of water or major drainages. It is a highly mobile species that is likely to use suitable habitat in the project area as a flyover resting site or potentially to forage. Project activities are expected to have a minor or negligible effect on the White-bellied sea-eagle.

Latham's snipe

Latham's snipe breed in Japan and far eastern Russia during the northern hemisphere summer. They migrate south after the breeding season, travelling across Papua New Guinea to winter in eastern Australia. Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia, that is it travels through northern Australia to reach non-breeding areas located further south. No precise information is available on the life expectancy, although banding data indicates that birds are capable of surviving for more than four years. The age of sexual maturity is unknown, but birds probably breed for the first time at one or two years of age.

Project impact and mitigation measures

The removal or degradation of ephemeral water bodies is likely to have the largest effect on Latham's snipe and the Australian painted snipe. High value habitat includes the large wetland associated with the dam at H2 and the dam at H13 which are both located within the footprints of West Pit 1 and South Pit 1. The creek diversion and crossings between South Pit 1 and South Pit 2 and south of the Northern Infrastructure

[27] Wallacea includes Sulawesi, the largest island in the group, as well as Lombok, Sumbawa, Flores, Sumba, Timor, Halmahera, Buru, Seram and many smaller islands

Area are also likely to affect the habitat for these species. The dam at H19 and the riparian areas along the Suttor River are located outside the development footprint and no impacts on these areas are expected to result from the project.

Impacts on the Latham's snipe and Australian painted snipe will be mitigated by having a suitably qualified spotter-catcher available when clearing in habitat areas and the provision of suitable habitat associated with offset benefits for the species as discussed in Section 35.11.2.3 of the EIS. These species may also benefit from the generation of foraging opportunities associated with the creation of new dams and cleared areas.

Rainbow bee-eater

The Rainbow bee-eater is widely distributed throughout mainland Australia and eastern Indonesia, including Bali, the Lesser Sundas and Sulawesi, and east to Papua New Guinea, the Bismarck Archipelago and, rarely, the Solomon Islands. The majority of the global population breeds in Australia, including on Rottnest Island and islands in the south-west Torres Strait. In Australia, the breeding season extends from August to January.

Project impact and mitigation measures

The Rainbow bee-eater is a common and widespread species across Australia inhabiting a range of habitat types throughout the project area including remnant and non-remnant vegetation. Foraging habitat is varied and includes disturbed and undisturbed areas while breeding habitat involves the excavation of a burrow in soil such as along a river bank, dam wall, gravel pit or soil piles. Sandy banks associated with water courses within the footprint of West Pit 2 and 3 and the Suttor River afford high quality nesting habitat.

Excavating open pits and stocking waste rock may increase the availability of nesting sites, while conversely increasing the susceptibility of nest disturbance as a result of ongoing project activities. This species utilises a broad range of habitats and all remnant vegetation within the project disturbance footprint would be considered suitable habitat.

Large areas of suitable remnant habitat will remain in areas which would not be disturbed by mining. The impacts are presented in Table 8.8. Impacts on this species may be mitigated by timing works in and around watercourses to avoid breeding times (September–February) and to deploy fauna spotter-catchers to search for nest burrows in stream banks when works during this period cannot be avoided.

Rufous fantail

The Rufous fantail is widespread from the Mariana Islands, south through Yap (Caroline Islands), to Sulawesi, the Moluccas and Lesser Sundas, east through southern Papua New Guinea, Louisiade Archipelago and Santa Cruz, to the Solomon Islands and Micronesia, and south to Australia. Within Australia the Rufous fantail occurs in coastal and near coastal districts of northern and eastern Australia. The Rufous fantail breeds from about September to February, with 81 per cent of eggs laid November to December. At elevations of more than 600 m above sea level in south-east Australia, they breed November to January.

Project impact and mitigation measures

This species utilises the shrub layer sub canopy of woodlands adjacent to riparian areas as breeding and foraging habitat. High value habitat is located at the farm dam at site H2 and the riparian corridor of waterways in the southern section of the project area. The removal of the dam and diversion of the creek located between South Pit 1 and South Pit 2 is likely to impact foraging habitat; however, this species typically breeds in moister vegetation types. Impacts on breeding habitat for this species may be mitigated by minimising impacts on the Suttor River riparian corridor as described throughout Section 35.7 of the EIS.

Species likely to occur

Cattle egret

The Cattle egret was originally native to Africa, south-west Europe, and Asia. The bird's range has expanded, particularly around the Pacific basin. Within Australia the Cattle egret is widespread and common according to migration movements and breeding localities surveys. The Cattle egret breeds in colonies in wooded swamps but may also breed in artificial situations or close to urban areas. East coast colonies operate in a well-defined breeding period from October to January.

Project impact and mitigation measures

The Cattle egret inhabits predominately shallow and open wetlands, but unlike the eastern great egret, forages away from wetlands in low lying grasslands and improved pastures. Suitable habitat for this species is more prevalent within the southern half of the project area, largely within the footprint of the West and South pits, within non-remnant vegetation in proximity to water.

The largest effect as a result of project activities is expected to be potential displacement during the construction phase. While noise and vehicle traffic may affect cattle egret activity during the operational phase, new dams and cleared areas may generate foraging opportunities. As this species breeds in colonies in the coastal areas of Australia, no disturbance to breeding habitat is expected as a result of this project.

Fork-tailed swift

The Fork-tailed swift is a non-breeding visitor to all states and territories of Australia.

Project impact and mitigation measures

The Fork-tailed swift is a highly mobile, aerial species which adapt to many habitat types. Breeding and foraging habitat are considered unlikely to be affected by the project.

White-throated needletail

The White-throated needletail is widespread in eastern and south-eastern Australia. This species does not breed in Australia.

Project impact and mitigation measures

The White-throated needletail is a highly mobile, aerial species which adapt to many habitat types. Breeding and foraging habitat are considered unlikely to be affected by the project.

Australian painted snipe

The Australian painted snipe has a scattered distribution throughout many parts of Australia. The Australian painted snipe may breed in response to wetland conditions rather than during a particular season with breeding recorded in all months in Australia.

Project impact and mitigation measures

The removal or degradation of ephemeral water bodies is likely to have the largest impact on Latham's snipe and the Australian painted snipe. High value habitat includes the large wetland associated with the dam at H2 and the dam at H13 which are both located within the footprints of West Pit 1 and South Pit 1. The creek diversion and crossings between South Pit 1 and South Pit 2 and south of the Northern Infrastructure Area are also likely to affect the habitat for these species.

The dam at H19 and the riparian areas along the Suttor River are located outside the development footprint and no impacts on these areas are expected to result from the project. Impacts on the Latham's snipe and Australian painted snipe will be mitigated by having a suitably qualified spotter-catcher available when clearing in habitat areas and the provision of suitable habitat associated with offset benefits for the species as discussed in Section 35.11.2.3 of the EIS. These species may also benefit from the generation of foraging opportunities associated with the creation of new dams and cleared areas.

Satin flycatcher

The Satin flycatcher is widespread in eastern Australia. The Satin flycatcher moves north in autumn to spend winter in northern Australia and New Guinea. They return south in spring to spend summer in south-eastern Australia.

Satin flycatchers occur singly or in pairs, and sometimes in groups of three or four. Where Satin flycatchers breed at elevations of more than 600 m above sea level in south-eastern Australia, they breed from November to early January.

Project impact and mitigation measures

Satin flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. The Satin flycatcher is considered likely to occur in riparian vegetation adjoining the Suttor River (outside of the project area).

Project impacts and mitigation measures – migratory birds

The positive impacts from the project in relation to MNES values are derived from the mitigations (and associated direct and indirect benefits) proposed for impacts to MNES values. Benefits can be realised for ecology in general (such as offsets) or for specific

species of migratory birds. Positive impacts and benefits would be realised most notably in the mid- to long-term, post construction and include:

- a net conservation gain for each impacted matter, implemented via an offsets package that consists of an offset which:
  - protects the associated protected value in perpetuity
  - has a management plan which reduces threats to the protected values (e.g. weeds or predators)
  - has land-based management techniques to improve the quality of the habitat or ecosystem
  - monitors and reports effectiveness
- generation of foraging opportunities resulting from new dams and cleared areas (such as for the Cattle egret)
- increase in the availability of nesting sites for some species resulting from the excavation of open pits and the stocking of waste rock.

Coordinator-General's conclusion—migratory birds

The potential impacts to migratory species in the project area are predicted to be minor as many of the species are highly mobile and capable of relocating with changes in the availability of suitable habitat. There are no recovery plans in place for those migratory species known or likely to occur in the project area. The project is not expected to substantially interfere with the recovery of migratory species. There are no migratory species where an ecologically important proportion of the population will be impacted.

8.6 A water resource, in relation to coal seam gas development and large coal mining development (sections 24D & 24E)

In deciding whether or not to approve the proposal for the purpose of section 24 or 24E of the EPBC Act, and what conditions to attach, the Commonwealth Minister for the Environment must consider if the proposal has a significant impact on a water resource or is likely to have a significant impact on a water resource. A water resource is defined under the *Water Act 2007* (Cwlth) as surface water or groundwater or a watercourse, lake, wetland or aquifer.

A significant impact[28] on a water resource is an action which directly or indirectly:

- results in substantial change in the quantity, quality or availability of surface or groundwater
- substantially alters groundwater pressure and/or water table levels
- alters the ecological character of a wetland that is state significant or a Ramsar wetland
- diverts or impounds rivers or creeks or substantially alter drainage patterns

[28] 'Significant impact' as defined in clause 38c of the National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development.

- reduces biological diversity or change species composition
- alters coastal processes
- results in persistent organic chemicals, heavy metals or other potentially harmful chemicals accumulating in the environment
- substantially increases demand for, or reduces the availability of water for human consumption.

This section provides an assessment of water resources and the potential impacts of the project. The issues relating to the potential surface water and groundwater impacts of the project and impacts on MNES, include:

- impacts to surrounding watercourses from mine water releases
- impacts to the palustrine wetland
- impacts on the Suttor River, flooding and erosion resulting from proposed watercourse diversions
- validation of lack of connectivity of aquifers
- changes in groundwater levels and water quality
- groundwater-dependent ecosystems—stygofauna.

8.6.1 Independent Expert Scientific Committee advice

Queensland is a signatory to the Council of Australian Governments (COAG) National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development (NPA). The NPA requires coal seam gas or large coal mining development proposals undergoing environmental impact assessment, and that are likely to have a significant impact on water resources, to be referred to the Independent Expert Scientific Committee (IESC).

On 24 July 2013, I submitted to the IESC a joint request for advice (with DE) on water-related matters for the project. The IESC considered the matter at its meeting of 21 August 2013 and the IESC responded to the joint request by providing advice to me and DE on 26 August 2013. This advice informed my determination on the scope of additional information to the EIS that I required from the proponent.

The IESC provided advice regarding the following matters on the Byerwen Coal project:

- suitability of site water balance modelling methodology for water resource impact
- impact of residual voids on groundwater and surface water quality
- need for a regional water balance model
- impacts on the palustrine wetland
- potential to alter the hydrology of surface water systems due to stream diversions, loss of catchment area and landform modifications
- potential for flood events to impact water quality of the Suttor River, by dispersing and scouring of material associated with the waste rock dumps
- impact of the project adding to the cumulative effect of mining projects in the Bowen Basin on surface and groundwater resources of the region.

I have responded to these matters in the groundwater and surface water sections of this report (sections 8.6.2, 8.6.3, 8.6.4).

8.6.2 Groundwater

Chapter 16 of the EIS and Chapter 15 of the AEIS described the groundwater resources and the potential impacts of the project on groundwater values. A groundwater technical report and background monitoring results are in Appendix 18 of the EIS. A water management strategy and mine site water balance and proposed mine water management system for the project was included in Chapter 8 of the EIS. Appendix 15 of the AEIS comments on the issue of a regional water balance model.

Generally, the groundwater assessment in the EIS adequately addressed the requirements of the TOR. A summary of the groundwater assessment is provided below.

Groundwater assessment methodology

The assessment methodology included:

- a desktop study of regional geology, hydrogeology, groundwater users, bore records, DNRM groundwater database, review of the proponent's coal exploration drilling programs, relationship of groundwater with local ecosystems and previous assessments
- an ongoing program of monitoring bores (including 11 dedicated groundwater bores) providing data including hydraulic conductivity tests. Water samples were collected in accordance with the *Queensland Water Quality Guidelines 2009*[29]
- a qualitative engineering review to ascertain subsidence risks of project components
- review of information and determination of likely impacts on the groundwater resource
- preparation of a strategy for management and monitoring of impacts.

Groundwater model

The Marinelli and Niccoli[30] analytical hydrogeological modelling[31] method was adopted to undertake groundwater pit inflows and predicted drawdown assessment. The proponent presented the method as a highly suitable model for estimating potential drawdown associated with project dewatering activities, reinforced by the conservative mathematical assumption that groundwater inflow to the pit is axially symmetric.

This method of hydrogeological modelling considers hydraulic conductivity, recharge, seepage face, pit dimensions, vertical hydraulic conductivities and standing pit water. Modelling was undertaken for numerous mine stages with varying pit depths and dimensions, providing pit inflow estimates for various stages of the mine life and

[29] Queensland Government, *Queensland Water Quality Guidelines*, Department of Environment and Resource Management, Brisbane, 2009.
[30] Marinelli and Niccoli, 'Simple Analytical Equations for Estimating Groundwater Inflow to a Mine Pit', in *Groundwater,* vol. 38, no. 2, March–April 2000 (pp. 311-314).
[31] An analytical model is a mathematical model that describes the physical processes and boundaries of a groundwater system using one or more governing equations. It make simplified assumptions (e.g. properties of an aquifer are considered to be constant in space and time) to enable a solution to a given problem.

modelled drawdown extents. Groundwater inflow estimates are presented in Table 8-4 of the EIS.

Flow rates generally increase over time as the pits progress deeper down. South Pit 1 and North Pit 1 are predicted to have the highest inflows. East Pit 1 is shallow relative to the groundwater table and does not intersect groundwater. The method was used to model drawdown extents for each pit and considered varying pit bench depths as they progress from west to east, over the life of each pit. The methodology is described in detail in Section 17.5.1 of Chapter 17 and Section 8 of Appendix 18 of the EIS.

I note that during the EIS there were no users of groundwater identified within or surrounding the project. I acknowledge the proponent's conclusion that this current situation results in a low risk of adverse impacts of the project to affect other groundwater users in the area, therefore not warranting a numerical model[32] during the EIS process.

I considered the advice from the IESC and the outcome of discussions with DNRM, DE and the proponent regarding the relevance of a numerical model versus the analytical model used by the proponent. In response, I have conditioned the proponent to update the groundwater model for the project no later than two years after the commencement of project activities and then every five years after commencement of activities and report the results to the administering authority. The condition requires the updated model to be independently reviewed to evaluate its appropriateness and accuracy for predicting changes in groundwater levels and surface water flow rates as a result of project activities. The recommended condition for modelling impact on water resources is in Appendix 3, Schedule 4, Recommendation 11.

Baseline information

The EIS concluded that there is very little groundwater of any significance—the groundwater in its natural state is generally brackish to saline and of poor quality, the aquifers are limited in hydraulic connectivity, and there is no groundwater–surface water interaction. The project area is 200 km east of the closest section of the Great Artesian Basin (GAB) and the groundwater associated with the project has no relevance to the GAB.

Table 17-1 of the EIS presents the environmental values for groundwater from the Queensland Environmental Protection Policy (Water) 2009 (EPP(Water)) and their relevance to project groundwater. Section 17.4.14 of the EIS presents the chemical analysis of the data collected from groundwater bores with the tabulated analysis presented in Appendix 18 of the EIS. The proponent has committed to ongoing sampling in the early stages of project development to collect a larger data set to enable a more robust statistical analysis of data for water quality parameters. Following my evaluation of the available data sets and the advice received from DNRM, DE and IESC on this matter, I have conditioned this commitment in Condition E3 of the draft EA contained in Appendix 2 of this report.

[32] A numerical model divides space and/or time into discrete pieces. Features of the governing equations and boundary conditions (e.g. aquifer geometry, hydrogeological properties) can be specified as varying over space and time. This enables more complex and realistic representation of a groundwater system than can be achieved by an analytical model.

Tables 8.9 and 8.10 contain data on the standing levels, airlift yield and field water quality in the Byerwen groundwater investigation bore suite and DNRM data from private groundwater bores. Figure 8.7 shows the location of the bores in relation to mining activities.

Table 8.9 Standing levels, airlift yield and field water quality in the Byerwen groundwater investigation bore suite

Bore ID	Total depth (TD) (m)	First water intercept (m)	Perforated interval (m from - m to)	Standing water level (m btoc)*	Airlift yield (L/s)	Electrical conductivity (µS/cm)	Hydrostra-tigraphic unit
BYGW01	59.5	59.0	47.5-59.5	11.24	.8	1870	Rangal Coal Measures
BYGW02	59.5	46.0	47.5-53.5	33.77	0.4	11 050	Fort Cooper Coal Measures
BYGW03	67.0	56.0	56-62	36.58	0.8	2720	Fort Cooper Coal Measures
BYGW04	119.0	66.0	95-107	78.53	0.1	8410	Fort Cooper Coal Measures
BYGW05	105		99-105, 81-93	94.7	0.0	No water intersected	Exmoor Formation
BYGW06	120.0	45.0	103-115	55.89	0.1	7580	Rangal Coal Measures
BYGW07A	68.5	26.0	65-69	21.18	10.0	2020	Tertiary Sand below Basalt
BYGW07B	52.0	27.0	46-52	22.86	0.3	4400	Basalt
BYGW08	66.0	59.0	56.5-65.5	43.37	0.1	20 200	Basalt
BYGW09	97.0	88.0	91-97	71.50	4.0	1560	Moranbah Coal Measures
BYGW10	52.0	35.0	40-52	43.02	0.1	5970	Rangal Coal Measures

Table 8.10 Department of Natural Resources and Mines data from private groundwater bores

Facility registered number	Property or holding	Bore name	Easting MGA94	Nothing MGA94	Cased depth (m)	Reported discharge (L/s)	Pumping equipment
RN 25633	Weetalaba	Rockhole	597618	7669314	18.3	1.25	Windmill
RN 25636	Weetalaba	3-ways	595464	7671126	37.2	0.88	Windmill
RN 25638	Weetalaba	Millers Well	591706	7670079	16.4	0.50	Windmill
RN25686	Not stated	Not recorded	596844	7640920	6.4	0.32	Windmill
RN60458	Byerwen	AGC26	589906	7657632	56.0	2.10	–
RN 60459	Byerwen	AGC35	595533	7658096	45.0	1.50	–
RN 100092	Not stated	MGC Suttor Creek No 2	598620	7644094	No strata log, no casing information	Not reported	–

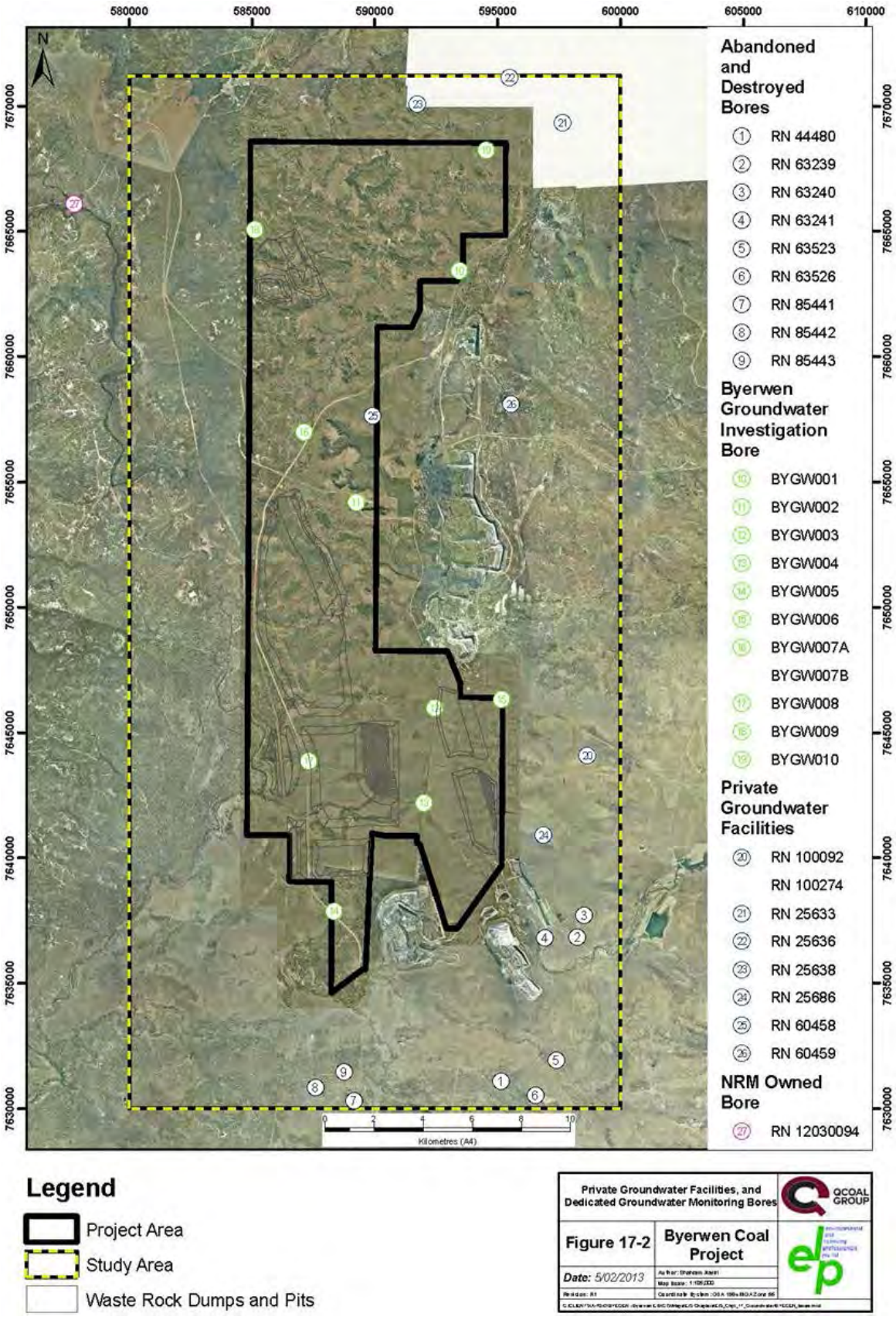


Figure 8.7 Private groundwater facilities and dedicated groundwater monitoring bores

Hydrocarbon data was not prioritised as part of the baseline data set as no groundwater-related industries other than extraction for mine dewatering or agricultural use exist in or adjacent to the project area within the coal measures. The proponent has committed to undertake confirmatory groundwater sampling prior to commencement of mining to verify the absence of dissolved hydrocarbons in groundwater.

Relevant private bores will be measured for groundwater level and quality before project mining commences to establish their baseline groundwater status.

Aquifer connectivity

Aquifers beneath the project area occur in a number of stratigraphic units including the Tertiary sand below Basalt, coal seam aquifers (mainly sandstone), Basalt and Suttor Formation. There are no alluvial aquifers of significance in the project area.

The EIS found that hydraulic connection between:

- the Tertiary sequence aquifers and deeper Permian sequence aquifers does not exist
- alluvium and Tertiary aquifers do not exist as there are no alluvial aquifers
- the Tertiary basalt and sand aquifers with the underlying Permian sequence does not exist as the groundwater in the basalt and sand aquifers is perched well above the Permian aquifer
- Permian coal seam aquifers is considered to be limited
- Permian coal seam aquifers and the underlying basement probably does not exist as basement lithologies are regarded as impermeable
- the Suttor Formation and the underlying Permian sequences is very limited based on the available data.

The static water levels (SWLs) are deep and there is generally a significant thickness of low permeability material or aquitards above any aquifers that are encountered. Section 17.4.2.1 of the EIS describes the SWL in the groundwater monitoring bores as higher than the depth at which the groundwater was intersected during drilling. This indicates that the hydrostratigraphic units in which the various bores were screened are confined. In addition groundwater level elevations from deeper formations which are observed as being higher than the groundwater level elevation in shallower formations, is indicative of hydraulic separation between hydrostratigraphic units.

There is no fixed relationship between the groundwater level elevation and the order of accumulation of the coal measure formations, or between the coal seams and other lithologies including the Tertiary. Based on the information presented in the EIS and further explanation and data presented in the AEIS, I am satisfied that there is a lack of hydraulic connection between hydrostratigraphic units across the project area.

Groundwater flow directions

The contour map of groundwater elevation in October 2011 presented in Figure 17-5 of the EIS suggests that groundwater flow in the Permian sequences is both to the north-east and to the south with a groundwater divide (mounding) between groundwater

bores BYGW02, east of West Pit 3, and BYGW03 west of East Pit 1 (Refer Figure 8.7). This groundwater divide correlates to the boundary between surface water drainage sub-catchments of the Rosella Creek sub-catchment to the north and the Upper Suttor River sub-catchment to the south.

Groundwater–surface water interaction

Section 17.4.12 of the EIS stated that bore data indicates negligible or no hydraulic connection between the Suttor Formation aquifers and the Suttor River. The EIS concluded that there is little or no groundwater–surface water interaction across the project area, as the SWLs are deep (20 m to 80 m below ground level) and there is generally a significant thickness of low permeability material or aquitards above any aquifers that are encountered. Surface water interaction is discussed further in section 8.6.3 of this report.

Groundwater recharge

Recharge of the Tertiary aquifers and the coal measure sandstone aquifers occurs by direct infiltration of rainfall. The majority of the recharge to the Permian coal sequence aquifers derives from slow infiltration through the predominantly clayey Suttor Formation. Permian aquifers are not recharged by the Tertiary aquifers or from alluvial aquifers. In other areas in the Bowen Basin it has been estimated that only about three per cent of incident rainfall results in recharge to the consolidated aquifers.

The proponent's automatic groundwater level data loggers in the bores BYGW05, BYGW07A and BYGW09 showed seasonal decline in groundwater level in these bores ranged from 0.08 m to 0.16 m between December 2011 to August 2012 (Refer figures 17-6 to 17-8 of the EIS). This level of variation is typical of low hydraulic conductivity aquifers. The proponent will continue to monitor seasonal groundwater level fluctuation.

Section 17.4.4 of the EIS concludes that there are no springs, seeps or swamps known within the project study area. In response to my concerns that the palustrine wetland may be partially groundwater fed, and therefore considered a spring, I requested further information from the proponent on groundwater/surface water interaction in the vicinity of the wetland. The proponent has committed to install a monitoring bore which will provide evidence of any relationship between palustrine wetland and groundwater. I have stated conditions for the draft EA requiring a groundwater compliance bore at the wetland to be monitored quarterly and fluctuations of water level reported and investigated (Appendix 2, Schedule E, conditions E3, E5 and E6).

Drawdown of regional groundwater levels

The proponent has advised that groundwater will not be used as process water during the life of the mine, as water will be imported to site from the Burdekin-Moranbah pipeline. Therefore, I am satisfied that there will be no impact on groundwater directly from process water requirements.

The proponent concluded that there is no hydraulic connectivity between various aquifers or between aquifers and the quaternary alluvium. This being the case, together with the extremely slow recharge rates, any predicted localised drawdown

within specific aquifers is considered unlikely to affect the hydrogeological recharge regime in any aquifer, outside the predicted drawdown.

The proponent purported that the Marinelli and Niccoli method is a highly suitable analytical hydrogeological model for estimating potential drawdown associated with the project dewatering activities. Based on the proponent's mine planning calculations, South Pit 1 in year 46 of the project life will have a maximum depth of 380 m below ground level, which is nominally 320 m below the existing water table. The dimensions of the deepest bench of South Pit 1 in Year 46 are approximately 3.6 km long and 160 m wide.

Drawdown will be at its maximum 320 m below the existing water table, and will gradually diminish as distance from the pit increases. South Pit 1 will induce drawdown in the local landscape to a distance of 2.3 km from the pit. There are no groundwater users, groundwater-dependent ecosystems (GDE) or hydraulic connections to the Suttor River within that distance of South Pit 1. This is the deepest and most extensive of the pits and as such is considered most likely to represent a 'worst-case scenario' of the eight mine pits for drawdown of groundwater levels around the project area resulting from pit dewatering. A conservative maximum extent of drawdown of 2.3 km was applied in the EIS to all aquifers intercepted by the pits.

In response to submissions from DNRM and DE and advice received from the IESC, the proponent prepared revised detailed geological cross sections and presented them in Chapter 15 of the AEIS and their response to me on the IESC advice. The geological cross sections show that mining commences on the eastern extent of the pits and progresses west, following the dip of the coal seams. As such, pits will be shallow in the west and deeper in the east.

The proponent conducted additional hydrogeological modelling for the AEIS using the Marinelli and Niccoli method, to model drawdown extents for each pit and considered varying pit bench depths as they progressed from west to east, over the life of each pit. The revised modelled drawdown specific to pit depths and spatial extents, indicates:

- drawdown does not extend under the Suttor River at any point, with the closest point being 650 m away and, as such, no impact on baseflow is expected
- drawdown does not extend to any private landholder bores
- drawdown does not go under the palustrine wetland.

The reduction of groundwater levels has the potential to destroy abiotic factors (such as water) necessary for an ecological community's survival. The EIS concluded that the project would not modify or destroy factors necessary for the survival of Brigalow and Natural Grasslands TEC outside of the direct impact areas.

Figure 8.8 shows the maximum extent of groundwater drawdown resulting from the project.

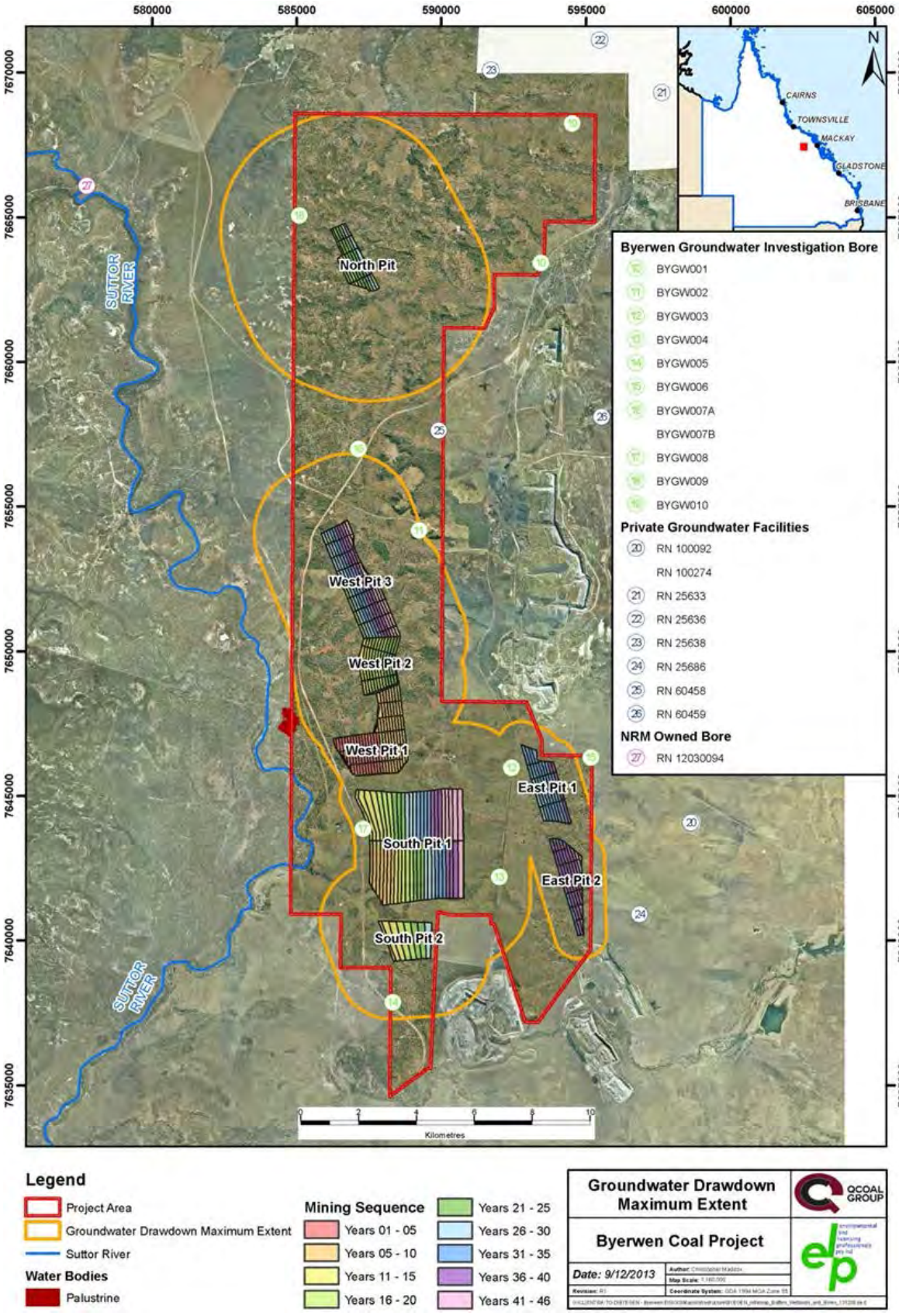


Figure 8.8 Groundwater drawdown—maximum extent

Section 34.8 of the EIS addressed the potential impact on private groundwater bores from the combined groundwater drawdown from the project and the adjoining Newlands Coal project (Suttor Creek and Wollombi) and proposed Newlands Coal Extension project. The revised modelled drawdown extents provided in the AEIS confirmed that there are no private landholder bores, palustrine wetlands or rivers potentially impacted by predicted drawdown of the mines' combined activities.

I acknowledge the commitment by the proponent to implement a groundwater monitoring strategy and continue to monitor seasonal groundwater level fluctuation in several of the dedicated groundwater monitoring bores (bore numbers BYGW05, BYGW07A and BYGW09) using the installed automatic groundwater level data loggers in the bores (Appendix 6, Commitment 161).

Where practicable, the private bores RNs 25633, 25636, 25638, 25686, 60458, 60459, 100092 and 100274 will be measured by the proponent for groundwater level and quality before project mining commences to establish their baseline groundwater status, with regular monitoring proposed. The proponent has committed to undertake quarterly monitoring of project groundwater monitoring bores (which are located in close proximity to these bores) for water level and water quality to provide comparative data on the groundwater in the areas of these bores (Appendix 6, Commitment 163).

Groundwater use in the vicinity of the project is only used for stock watering. Dewatering from project mining activities is expected to have negligible or no impact on this use, as the modelled drawdown extent does not predict drawdown of groundwater levels at private groundwater bores except RN 25686. Of the private bores listed above and shown in Figure 8.8, only RN25686 has the potential to be impacted by the project as it is within the 2.3 km radius of drawdown of any pit, at a distance of 1.95 km from East Pit 2 following year 35 of mining operation. The location and reasons why the other private bores will not be impacted are discussed in section 17.5.2 of the EIS.

Should a possible operation-related impact on private bores be detected, the proponent has committed to investigate the cause. Depending on the issue, investigations may include confirmatory water quality sampling, comparison against private bore baseline levels, project bore water level trends, project activities and any known non-project activities. The proponent will make recommendations about short, medium or long-term impacts and required management or mitigation measures (Appendix 6, Commitment 164).

The proponent has developed a groundwater monitoring strategy to be implemented during construction, operations and decommissioning. Details of the strategy are in Commitment 168 (Appendix 6). The proponent also commits to develop a groundwater monitoring plan to incorporate the strategies in Commitment 168 and incorporate standards and indicators against which groundwater impacts can be measured (Commitment 169). The groundwater monitoring program will be implemented by the proponent within the project area for the life of the project using the dedicated groundwater monitoring bores to accurately measure any actual drawdown impacts from the pits as they are developed.

As the project is not located in a regulated groundwater management area, the proponent is able to take groundwater for its production purposes, or passively through

mine dewatering, without the need for an authorisation under the Water Act. I acknowledge that the proponent has advised it does not intend to take groundwater for its production purposes and that the State government does not have a regulatory regime to apply ongoing conditions in regard to water taken by the proposed mine as it is outside a regulated groundwater area. Therefore, I have recommended a condition that, should extraction of groundwater occur as part of project activities, it must not directly or indirectly adversely affect any watercourse or wetland unless authorised under the conditions of this Coordinator-General's report or by another authorisation under the Water Act (Appendix 3, Schedule 4, Recommendation 10(c)).

The Byerwen groundwater monitoring proposed in the proponent's EM Plan (Schedule E Table 1) of the EIS was updated in the AEIS to include a recently constructed bore near the palustrine wetland. Proponent Commitment 403 (Appendix 6) confirms its intention to establish a groundwater monitoring bore targeting the tertiary material at this location for a minimum of twelve months prior to dewatering activities in the area. This will ensure availability of a full year of baseline data incorporating any seasonal fluctuations. The monitoring program proposed by the proponent is now adequate for my requirements. I have conditioned groundwater monitoring locations, frequency, personnel and record keeping timeframes as stated in conditions A6, E2, E3 for the draft EA (Appendix 2, Schedules A and E).

I have also recommended a condition of approval where the Commonwealth will be advised if the groundwater level triggers, provided in stated condition E5 and E6 for the draft EA (Appendix 2, Schedule E), are exceeded. Reports are to be provided as required on the cause, response, and actions undertaken to prevent further occurrences (Appendix 3, Schedule 5, Recommendation 16.

The EIS concluded that the project would result in little to no impact on existing groundwater users so the proponent has made no commitments relating to make good arrangement to other water users. Open-pit mining and dewatering will occur over a period of 46 years and, should groundwater monitoring in the private bores or updated groundwater modelling indicate that there is an impact on a water entitlement holder during that time, I have recommended a condition (Appendix 3, Schedule 4, Recommendation 12(e)) to ensure water security.

Groundwater-dependent ecosystems

The proponent assessed the four categories of GDEs and concluded that one of the categories exists in the project area. There was no record of terrestrial GDEs in the project area (woodlands dependent on shallow groundwater, and vegetation along dry riverbeds). They may exist along the Suttor River to the west of the project area. The proponent's EIS studies suggest there is no groundwater–surface water interaction between the aquifer sequences beneath the project area and the Suttor River alluvium. Therefore the project mining activities will have no impact on terrestrial GDE.

The second category of river baseflow GDE (ecosystems reliant on groundwater discharging to streams, springs, seeps and swamps) are not known in the project area. There is no groundwater–surface water interaction between the aquifer sequences beneath the project area and the watercourses that traverse the project area. Therefore project mining activities will have no impact on river baseflow GDE.

There are also no records of wetland GDE category in the Belyando Suttor River systems and it is concluded that this GDE will not be impacted by the project's mining activities. The proponent concluded that the palustrine wetland in the project area is not a wetland GDE. It is not connected to the 'deep' groundwater bearing units that have the potential to experience groundwater drawdown and would not be impacted by mining activities.

The final category, aquifer GDE (ecosystems that exist in the subsurface, entirely dependent on groundwater) include stygofauna which are present in the groundwater. Stygofauna were the subject of a study across the project area presented in Chapter 20 and Appendix 21 of the EIS with additional information in Chapter 15 of the AEIS.

Two adjoining mining leases (the project site and Newlands Mine) share the same hydrogeology, with common aquifers hydraulically connected with sufficient conductivity to allow the movement of stygofauna within the aquifers. The project site and Newlands Mine stygofauna datasets were combined to generate a comprehensive stygofauna dataset encompassing 75 individual samples collected from 28 bores over a four-year timeframe (2008 to 2011) in order to inform the EIS.

Two stygofaunal taxa were recovered from one of the 20 Newlands Mine bores sampled annually for four years. The Newlands Mine data shows that stygofauna are low in diversity and abundance at this locality. The stygofauna pilot study failed to identify significant stygofaunal communities. Collectively, the data suggest that stygofauna (that is stygophiles, stygobites and phreatobites) are poorly represented within the Byerwen and Newlands Mine mining lease areas.

The stygofauna collected from both the Newlands Mine and the project-specific surveys are not endemic, because the order/family they belong to occur in all Australian states. The EIS concluded that the impacts of the proposed removal of the stygofauna habitat in this location will not threaten or risk the survival of the amphipod and copepod taxa at the order/family level of taxonomic resolution. Therefore no avoidance or mitigation measures for stygofauna were proposed in the EIS. In response to a submission by DNRM regarding sampling methodology, the proponent has committed to undertake an additional round of confirmatory stygofauna sampling in project monitoring bores. Sampling will be undertaken prior to the commencement of groundwater dewatering activities and after a preceding wet season (Appendix 6, Commitment 398).

My consideration of impacts for stygofauna and determination of mitigation strategies is dependent upon the completion of the second round of sampling for stygofauna. In addition to the proponent's commitment, I have stated a condition for the draft EA in Appendix 2 of this report requiring further assessment of stygofauna prior to the commencement of dewatering activities. If significant species of stygofauna are likely to be impacted, the proponent must implement protection control strategies.

Groundwater quality

I acknowledge the proponent's commitment to ongoing groundwater quality and groundwater level monitoring outlined in the project's EM Plan and stated in Commitment 419 of Appendix 6 of this report. To ensure this commitment is

implemented, I have stated a condition for the draft EA that the proponent must not release contaminants to groundwater (Appendix 2, Schedule E, Condition E1).

I have also stated conditions for groundwater quality triggers and monitoring. Should a trigger be exceeded I have stated conditions for investigations, actions to minimise environmental harm and notification procedures in Schedule E of the draft EA. Stated Condition E5, Schedule E, Appendix 2 requires the proponent to investigate any exceedance of set groundwater quality or groundwater level limits.

I have recommended a condition of approval to the Commonwealth Minister for the Environment for a groundwater monitoring and management plan (GMMP) (Appendix 3, Schedule 5, Recommendation 15). It is to address water quality and monitoring and be submitted for approval prior to the commencement of dewatering activities in mining pits. I have also recommended a condition of approval for the Commonwealth to be advised if the groundwater quality triggers are exceeded, with reports as required on the cause, response, and actions undertaken to prevent further occurrences (Appendix 3, Schedule 5, Recommendation 16).

Waste rock and rejects

Chapter 9 of the EIS discussed waste rock and rejects and concluded there is a low risk of acidity forming from low concentrations of metals and metalloids. There will be a low risk of salinity and dispersion from the weathered material as it will be covered by unweathered material and not left exposed.

The EIS concluded that seepage into the groundwater around the pits is extremely unlikely as there will always be a hydraulic gradient into the pit where water is collected and managed while pits are being dewatered. The proponent has committed to collect water that accumulates in pits as a result of groundwater inflow and surface water runoff in sumps and pump it to mine affected water dams at the surface. The limited potential for seepage into groundwater from waste rock dumps or in-pit rejects management facilities will have minor impacts on groundwater quality and negligible impacts on groundwater values described above as the groundwater is generally brackish to saline and of poor quality.

Waste rock will be managed by the proponent, including the development of a mine waste management plan (Appendix 6, Commitment 64). Preventative measures, such as selective placement of waste rock within waste rock dumps, will assist in reducing any potential impacts on groundwater. In addition to the commitments made in Appendix 6, I have stated conditions for the draft EA in Appendix 2, Condition H6 and H7 surrounding the management of waste rock.

Final void water quality and interaction with groundwater and surface water

The project will create four mine pits which will remain as permanent ‘final void’ pits after mine closure in year 50. The combined area of 1342 ha is shown in Figure 8.9 below and the revised final void assessment in Appendix 9 of the AEIS in Figure 1.1 (Final Landform) and Figure 4.1 (Final Void Layout).

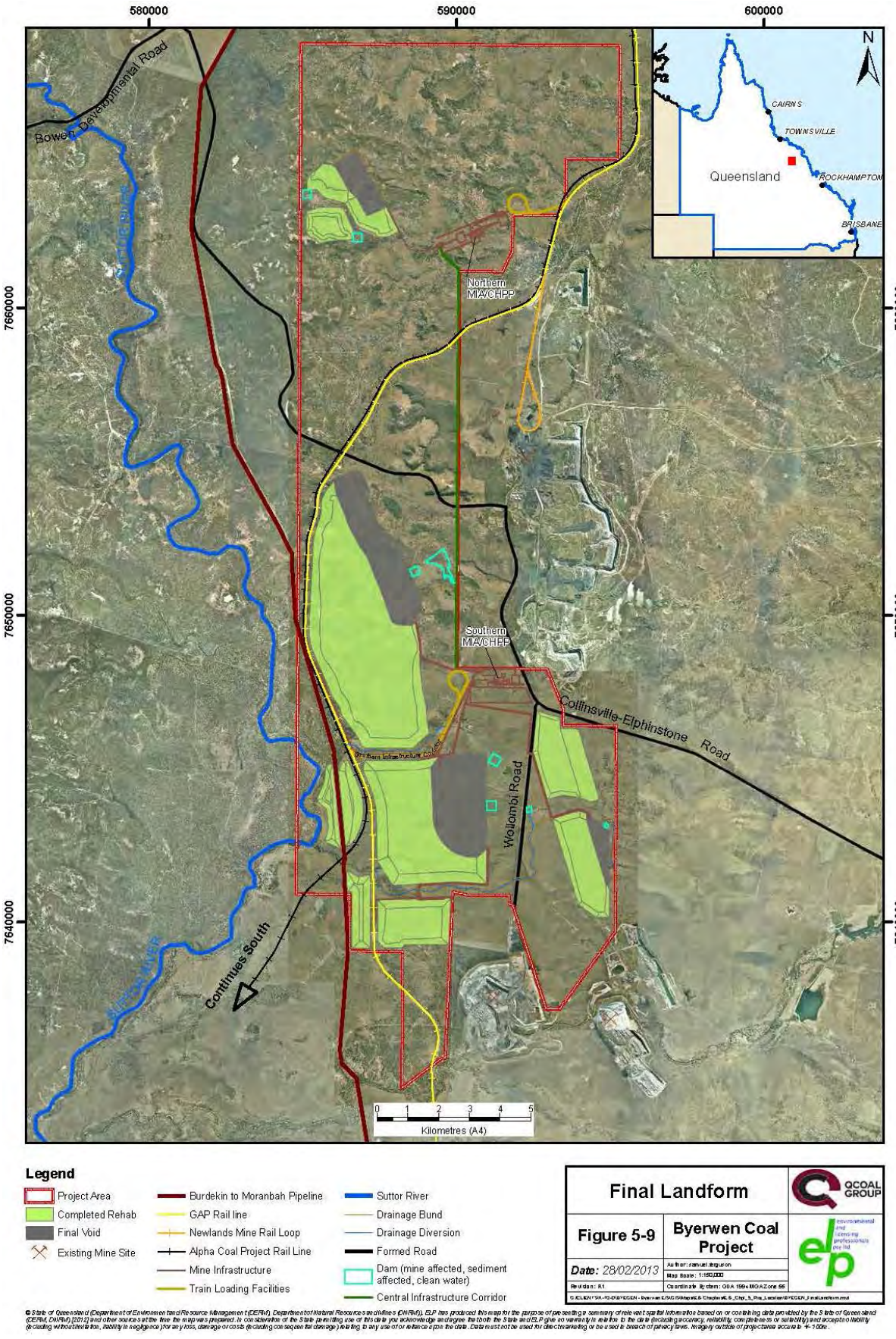


Figure 8.9 Final landform at mine closure showing final pit voids

The void pits will form pit lakes over 120 to 390 years as they fill from groundwater inflows, surface water runoff and direct rainfall to depths ranging from 50 m to 350 m. The voids will be isolated to minimise catchment extent and avoid release into the surrounding surface water system as the void water quality is expected to be of a poorer water quality than surface water systems. Salinity of final void water is expected to increase over time and range between 1000 mg/L and 10 000 mg/L. Waste rock geochemistry testing suggests that there is a very low risk of acid generation, and the water entering the voids from the pit walls would not adversely affect void water quality. The salinity of near-surface pit water is predicted to be much lower than at depth, with high dissolved oxygen, neutral to slight alkalinity, with low to very low dissolved metal concentrations.

Final void water will interact with groundwater by flowing into the surrounding groundwater if it stabilises above the surrounding groundwater level. The EIS concluded that there is a modelled probability that the East Pit final void water level will exceed the regional groundwater level, allowing movement of void water into the surrounding regional groundwater. In the base case and high emission climate change modelling scenarios there is a 15 per cent probability and in the high hydraulic conductivity scenario a 5 per cent probability.

The risk of surface water from flood waters entering the voids will be mitigated by the proponent through the construction of permanent levees as regulated structures designed to a 100-year Average Recurrence Interval (ARI) standard. Flood modelling for the Suttor River predicted the presence of the levees will not affect the distribution of floodwaters over land during a flood event up to a probable maximum flood (PMF) event as not ever interacting with any of the final voids post mine closure. Therefore there would be no impact on surface water quality. Flooding is discussed further in the surface water section 8.6.3 of this report.

Final void water levels and management

Modelling indicated that the steady state water level within all the pits, except East Pit as described above, will be lower than the regional groundwater table, which will create a permanent groundwater sink resulting in the water level never reaching ground level. I acknowledge the proponent's conclusion of the low risk of final void water levels exceeding the local groundwater levels. If this occurs, then final void water could be released to groundwater.

Appendix 9 of the AEIS presented an updated Final Void Assessment. Section 2.2 of the assessment considered a range of options for the final void end-use, including backfilling, water storage, wetland, waste disposal and restricting access.

The proponent presented restricting access as the preferred option, with permanent, self-sustaining bunding and levees around the void pits to limit access to the voids by people and fauna, including species listed in the EPBC Act and discussed in this chapter. The proponent has committed to make the residual voids safe and stable. The EIS stated that the mitigation measures to be implemented to achieve this outcome require no ongoing management over the long term after mine closure.

Appendix 9 of the AEIS concluded that it is a financially viable option to completely backfill four of the eight voids, with progressive in-pit dumping of waste rock to be

undertaken by the proponent. The remaining four voids will be progressively partially backfilled and rehabilitated during the mine life. The option of partial backfilling was chosen as the proponent has concluded that complete backfilling would require the transporting of out-of-pit waste rock, from previously rehabilitated waste rock dumps, to the voids. While this is technically possible, the haulage cost of transporting the quantity of waste rock material would not be a viable (AEIS, Appendix 9).

Backfilling of all voids would also require additional earthworks to backfill the last open pit after the saleable coal product has been removed. In addition, as the proponent's mine plan does not deplete the entire coal resource, backfilling the voids with waste rock would inhibit access to the coal seam face and sterilise the coal in the deeper seams from being mined in future if it becomes economic to do so.

As the proponent intends to restrict access only and not manage the final voids post decommissioning, I have taken a precautionary approach to this intergenerational impact. I have noted the IESC's advice that backfilling of voids represents best environmental practice. I have considered the uncertainty regarding final void water level modelling results and the addition to the existing legacy of multiple final voids in the Bowen Basin region.

I have stated a condition for the management of residual voids. Under my Condition H14 for the project's draft EA (Appendix 2, Schedule H) the proponent must ensure that residual voids do not cause any serious environmental harm to land, surface waters or any recognised groundwater aquife0r. I expect this conditioned outcome to be addressed during operation and post mine closure through the mine closure plan and the post-closure management plan to be prepared by the proponent.

In addition, I have stated a condition for the project's draft EA (Appendix 2, Schedule H) that all reasonable and practicable measures must be undertaken to minimise the size of the void remaining after the cessation of mining activities.

I note that the proponent has committed to collect data over the 50-year life of the mining operation to prepare a strategy for final voids and refine it prior to mine closure. I require the proponent to refine and implement the strategy from commencement of operations through the 46 years operation to account for changes in technology and financial viability to minimise the size of the voids as per Condition H15 in Appendix 2, Schedule H.

Section 9.5.2.1 of the EM Plan (14 May 2014) sets out the components of the final void investigation to be prepared by the proponent and to be reviewed every five years. It includes a study of options available for minimising final void area and volume and the proposal for end-of-mine void final use.

I expect the groundwater and surface water monitoring to extend beyond the project's 50-year life towards the point of hydrologic and hydrochemical equilibrium. This is to ensure that any impacts from the potential discharge of void water are detected and appropriate mitigation measures can be applied post mine closure. Section 9.5.2.1 of the EM Plan (14 May 2014) sets out the proponent actions to undertake a residual void water quality management study to model and assess the predicted quality of void water between cessation of mining and the post-mining equilibrium. The results of this monitoring are to be provided to the relevant State government environmental authority

at the time of equilibrium to provide sufficient evidence of equilibrium, should complete backfilling of all eight voids not occur. The proponent has committed in section 9.8.4 of the EM Plan (14 May 2014) to prepare a post-closure management plan for the project site, to be implemented for a period of 30 years following final coal processing on site, or a shorter period if the specified criteria are met.

Vulnerability to pollution

The proponent will avoid contamination of groundwater in accordance with EPP (Water), through construction, operation and decommissioning phases of the project. This is to be achieved through design of facilities to prevent release of contaminants and adopt hydrocarbon and chemical handling, storage and spill response procedures that will minimise the risk of contaminant release and contain any accidental releases. I have stated a condition for the project's draft EA in Appendix 2, Schedule E stating that the contaminants must not be released to groundwater.

The project's co-disposal dams will be constructed in accordance with the requirements of the *Manual for Assessing Hazard Categories and Hydraulic Performance of Structures*[33] to prevent contamination of groundwater and to minimise seepage. I have stated conditions for the project's draft EA in Appendix 2, Schedule J for the design, operation, inspection and decommissioning of regulated structures.

The vulnerability to pollution of the groundwater in the Suttor Formation, Tertiary Sands below Basalt and the confined coal seam aquifers from the surface activities of the project was shown to be low. I am satisfied that the proponent's commitments and my stated conditions in the draft EA are sufficient to avoid this impact.

Coordinator-General's conclusion—groundwater

I have considered the information provided in the EIS and the additional information provided by the proponent in the AEIS and the EM Plan of 14 May 2014 and determined that it has adequately addressed the issues raised in submissions on the EIS. I have evaluated the impacts of the project on groundwater quality and drawdown as it relates to ecological communities and landholders. I have concluded that a precautionary approach must be taken resulting in a suite of stated and recommended conditions in Appendix 2 and Appendix 3, to avoid impacts including the implementation of a comprehensive groundwater monitoring program.

8.6.3 Surface water

The project is located within the Rosella Creek and Upper Suttor River sub-catchments of the Bowen River catchment and Suttor River catchment respectively, which are both part of the headwaters of the Burdekin Basin. The key watercourses under the Water Act directly affected by the project are Kangaroo Creek and a tributary of Kangaroo Creek, which drain the northern portion of the mine, and a tributary of the Suttor River, which drains the southern portion. Kangaroo Creek and the Suttor River are both

[33] Queensland Government, *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*, Department of the Environment and Heritage Protection, Brisbane, 2013.

ephemeral in nature. The Suttor River discharges into the Belyando River, which drains into the Burdekin Falls Dam.

There are also a number of wetlands in the project area including lacustrine wetlands, a gilgai wetland and a palustrine wetland. Of particular importance is the seasonal palustrine wetland intersected by the western boundary of the project area. The wetland is designated by DEHP's Queensland wetlands mapping as having high ecological significance (HES).

Chapter 15 of the EIS describes the existing surface water quality, environmental values, potential impacts on surface water and proposed mitigation and management measures. Maps of the catchments and palustrine wetland are provided as Figures 15-1 to 15-5 in Chapter 15 of the EIS.

Mine water infrastructure proposed by the proponent includes six clean water dams, 14 mine-affected water dams, 17 in-pit sumps and 27 sediment-affected water dams. Five waterway diversions are proposed in order to divert existing waterways around the pits and waste rock dumps. Water management on site is addressed in Chapter 8 of the EIS and the mine water management strategy, including mine water release to surrounding watercourses, is detailed in Appendix 11 of the EIS. Waterway diversions can be seen in Figure 16-20 in Chapter 16, Section 16.6 of the EIS.

Surface water assessment methodology

The methodology used to assess the hydrology of the project's catchments and impacts on hydraulics is detailed in section 16.4.1 of the EIS. A hydraulic model was established for the Suttor River to include all floodplain areas within the PMF extent.

A review was conducted of relevant reports and investigations undertaken in the vicinity of the project over the last 10 years. Review of hydro-meteorological data, survey data, flooding data and cadastral information was undertaken. The hydrological analysis included producing a hydrologic rainfall-runoff model and the affected catchments, verifying the model, simulating design rainfall for a range of probabilities up to the 1000-year ARI event, including PMF and adopting appropriate design flood hydrographs for input into the hydraulic model. The model was also calibrated against historical flood events with the simulated flood hydrograph compared with recorded discharge at Eaglefield river gauge station on the Suttor River. Appendix 17 of the EIS provides a detailed description of the XP-RAFTS model, catchment delineation and catchment roughness.

A site assessment to specifically define drainage features into the categories of watercourses (assessable under the Water Act) and drainage lines (not assessable under the Water Act) was undertaken by DEHP. Of the five diversions, only two are defined as watercourses and three are defined as drainage lines.

Mine water releases

One of the critical issues for the project was the proposed draft water quality objectives (WQOs) for the mine water releases. The proponent proposes to release mine-affected water to nearby waterways in order to balance the mine water inventory. The releases are proposed to occur through a controlled release strategy that allows discharge only

when specific flow and water quality criteria are satisfied through testing and monitoring.

Water on site will be classified and managed as either:

- mine-affected water—from disturbed catchments or groundwater inflow into open pits
- sediment-affected water—from disturbed catchments suitable for discharge after sediment removal or
- clean water—from undisturbed areas, bypassing mine affected areas, suitable for natural discharge.

Potentially contaminated runoff will be treated to improve the quality before being released to the mine water system as mine- or sediment-affected water. Water associated with the CHPPs and co-disposal facilities will be managed separately in a closed circuit and will not be released to the environment. Co-disposal dams will be regulated dams and designed by a Registered Professional Engineer of Queensland (RPEQ) in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures.*[34] This includes designing the dams to prevent discharge during a flood event.

Environmental values (EVs) for Rosella Creek and the Upper Suttor River sub-catchments were identified by the proponent. WQOs are used as the basis to protect the EVs, develop mine water release criteria, set release limits for mine-affected water and establish a monitoring program.

DEHP has published the *Queensland Water Quality Guidelines*[35] that include a set of default trigger values for a range of water quality characteristics. For most parameters, the WQO default trigger values were proposed by the proponent, with the exception of pH, electrical conductivity, turbidity, total nitrogen and aluminium. For these characteristics, higher parameters were proposed compared to the default triggers to use as the basis for future management of water quality.

A number of monitoring stations are proposed both upstream and downstream of the release points to provide information about water quality both prior to and after releases. Trigger investigation levels were identified for downstream compliance points.

DEHP's main concern regarding the proposed WQO trigger values that deviate from the default values was the limited sampling information presented in the EIS and AEIS to justify the alternative values proposed. DEHP and the proponent worked together to develop an acceptable range of site specific water quality outcomes and trigger limits. Where these could not be agreed upon, DEHP recommended the proponent adopt the default triggers and commit to a three-year monitoring program (or 10 flow events) to provide a robust suite of background water quality parameters to determine suitable release limits. The proponent can then submit an application to amend the trigger

[34] Queensland Government, *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures,* Department of the Environment and Heritage Protection, Brisbane, 2013.
[35] Queensland Government, *Queensland Water Quality Guidelines,* Department of Environment and Heritage Protection, Brisbane, 2009.

values in the EA if monitoring shows it is warranted. Until then all values will be considered interim values.

Palustrine wetland

The palustrine wetland on the western boundary of the project was surveyed twice as part of the EIS surveys. During the late wet season surveys in May 2012, the wetland covered an area of approximately 60 ha (1 km × 0.6 km), with an average depth of 0.5 m. The wetland was largely dry during the early wet season in December 2012.

The palustrine wetland is not within the project disturbance footprint, however the placement of a waste rock dump to the east of the wetland will reduce the wetland's catchment area from 4.2 km^2 to 2.4 km^2 (representing a 43 per cent reduction). The catchment will be reduced for a period of approximately 16 years until the waste rock dump is rehabilitated. The EIS concludes the reduction will temporarily reduce the functionality of the wetland. The project's impacts on the ecology of the wetland are further addressed in the aquatic ecology section of this report (see section 5.2).

Submissions from DEHP and DNRM raised issues about the hydrological flows to the wetland described in the EIS. In response, I requested the proponent to further investigate potential surface water and groundwater interaction. The proponent installed a shallow borehole adjacent to the wetland to provide hydrological information and to collect baseline data for 12 months prior to dewatering activities. The proponent's AEIS concluded that the palustrine wetland is not connected to the 'deep' groundwater bearing units that have the potential to experience drawdown. The palustrine wetland may have shallow underlying tertiary/quaternary groundwater which is perched. This groundwater is not connected to any deeper groundwater which may be impacted by dewatering activities.

I agree with DNRM's view that the data presented is insufficient to draw a conclusion about the interrelationship between surface and groundwater. Therefore, I have recommended a condition for a monitoring and reporting program that will enable further investigations into groundwater-surface water interactions, with particular reference to the wetland, prior to commencement of mining operations.

DEHP was concerned that the EIS did not propose monitoring or mitigation measures for the project's impact on the wetland, or rehabilitation strategies to ensure functionality is restored to the wetland.

In response to DEHP's concerns, the AEIS included information and commitments related to monitoring changes to the wetland and mitigation measures (Appendix 6, commitments 403 and 404). The shallow borehole adjacent to the wetland will also monitor hydrological changes to the wetland. The remediation strategy for the wetland catchment set out in the revised EM Plan involves returning the land to a similar hydrological profile thereby creating a similar catchment for the wetland. The proponent's AEIS stated that no direct rehabilitation of the wetland is proposed as it is expected the wetland will return to natural hydrological conditions after the hydrological profile has been returned to its pre-development state. This is predicted to occur approximately 16 years after the waste rock dump is first established.

Impacts on Suttor River surface flow resulting from watercourse diversions

A number of submissions on the EIS were concerned with the potential impacts of the proposed watercourse diversions.

DEHP's submission raised the issue of assessing the watercourse diversions and their impact on the Suttor River's base flows and environmental values. Chapter 16, Section 16.6 of the EIS described the diversions as intercepting water that is flowing along an existing waterway and redirecting it around pits or waste rock dumps before connecting back into the original waterway prior to the waterway entering the Suttor River. The proponent's AEIS response to DEHP's issue was that the diversions will ensure flow is returned to the original waterway and there will be no change in catchment area. The proponent anticipates a negligible impact on the Suttor River.

DNRM's submission requested the proponent undertake further assessments to inform the design of the two watercourse diversions (as defined under the Water Act), including a hydrologic and hydraulic analysis of watercourses proposed to be diverted. DNRM also requested the watercourse design reflect the geomorphological and vegetation characteristics of the existing watercourses to ensure flooding and erosion will not be increased.

Aurizon also made a submission concerned with potential flood impacts of the diversions on current and proposed rail infrastructure and requested collaboration on hydraulic modelling.

Following my request for additional information to address these design issues, the proponent's AEIS included a hydrologic and hydraulic analysis and a progressed diversion concept design to address DNRM's and Aurizon's concerns. The AEIS concluded that the diversions will not increase catchment size or flow of water and will therefore not affect rail infrastructure. The proponent has made a number of other commitments relating to the proposed diversions, including a commitment that the two diversions which fall under the Water Act will be designed, constructed, monitored and maintained in accordance with DNRM's guideline *Watercourse Diversions – Central Queensland Mining Industry, Central West Region, Queensland*[36] (Appendix 6, commitments 412 to 414 and 417). The proponent also committed to ongoing stakeholder consultation with adjacent landholders with respect to water management (Commitment 402).

Submissions on the EIS raised concerns about the ecological functioning of the diversions to avoid biodiversity loss. I have evaluated the ecological aspects and impacts of the diversions in section 5.2 of this report. I recognise the habitat importance of the diversions and have included a condition for the draft EA requiring the proponent to rehabilitate in accordance with the specified rehabilitation criteria (Appendix 2, Schedule H, Condition H1 and Table BY1). In addition the proponent has committed to monitor the physical and biological condition of diversions (Appendix 6, Commitment 202) and has prepared rehabilitation criteria that aim to ensure vegetation is re-established and fauna can safely return to the waterways.

[36] Queensland Government, *Watercourse Diversions – Central Queensland Mining Industry, Central West Region, Queensland,* Department of Environment and Resource Management, Brisbane, 2011.

Flooding

The project has the potential to cause changes to flood extents, depths and velocities for the Suttor River.

Changes to the hydrology of flood flows resulting from the project were described in Chapter 16 of the EIS. Figures 16-3 to 16-9 of the EIS show the pre-development flood extents, depths and velocities for the 1-in-100-year, 1-in-1000-year and probable maximum flood (PMF). Figure 16-3 shows that flooding from the Suttor River is not the main source of water for the palustrine wetland.

Figures 16-10 to 16-19 of the EIS show the modelled impact with the proposed project. The modelling and analysis shows a change in the flood extents with the project compared with pre-development scenarios in the PMF event, when the waste rock dumps will partially block the floodplain flow and increase the average velocity by 0.1 m/s. In the 1000-year ARI flood event, flood waters would reach the waste rock dumps with a velocity of 0.5 to 2.0 m/s and an increase in depth of between 0.02 m and 0.2 m. The proponent will construct non-erodible rock armouring to mitigate impact of floodwaters on the waste rock dump.

Flood modelling undertaken by the proponent showed that under a 1000-year event the mine pits will not be affected by floodwaters from the Suttor River. The PMF flood event reaches the south-western corner of South Pit 1. However, the final void in South Pit 1 will not be affected by the PMF flood event. The proponent will construct drainage diversions to mitigate against flooding of the other open pits and final voids from drainage lines and water courses that intersect the proposed open pits. The pit voids will also be protected from ingress of overland flow that may otherwise result in overtopping of the voids during the mine life or after mine closure.

It is highly unlikely that void water will be discharged to the surrounding environment via overtopping resulting in no impact on aquatic ecology in surrounding waterways and wetlands. The proponent confirmed that flushing of water out of voids is not proposed as modelling has shown that there is no risk of overflow of water out of the voids. The EIS concluded that there will be no impacts on the region's surface water from the final voids given no water will be discharged by overtopping.

The proponent concluded there will be no adverse impact from the project on MNES caused by changes to the flood regime following implementation of committed mitigation measures detailed in the EIS, AEIS and the EM Plan dated 14 May 2014.

Coordinator-General's conclusion—surface water impacts

I am satisfied that water management on site has been given a high level of consideration by DEHP, DNRM, DE and the proponent during the EIS and AEIS stages of the project's assessment. The proponent updated the EM Plan contained in the EIS and AEIS to include a range of water management, monitoring and mitigation measures, including actions to rectify in the event trigger levels are exceeded. The EM Plan (14 May 2014) is available on the proponent's website. I have stated a number of conditions for the draft EA in Appendix 2, Schedule F (conditions F1–F28) to manage the water releases of the mine and limit potential impacts on surface water quality. The proponent has also made a range of commitments to protect surface water quality.

I acknowledge that the proponent's modelling with the project shows a predicted a 43 per cent reduction in flows to the palustrine wetland for a period of approximately 16 years caused directly by the operations of the project. I require the proponent, as per its commitment, to monitor changes to the wetland so that mitigation measures can be taken if necessary. The proposed monitoring and reporting program will also enable further investigations into groundwater–surface water interactions. I have stated a condition for the draft EA (Appendix 2, Schedule F, Condition F20) requiring a receiving environment monitoring program (REMP) related to the wetland. In addition, my stated Condition F21 aims to ensure rehabilitation will return functionality of the wetland as close to (or better) than pre-development condition.

In relation to the diversions, the proponent's EM Plan contains a requirement for a water management plan to be developed and implemented for the site that will manage the diversions until they are stable. Condition H1 (Appendix 2, Schedule H) requires rehabilitation in accordance with rehabilitation criteria in Table BY1. The rehabilitation objectives in relation to the stream diversions seek to ensure the diversion design mirrors natural stream functions and achieves a stable channel and appropriate erosion rates.

Further, given that future applications for licences are required under the Water Act for watercourse diversions and related hydrological impacts, I am satisfied the impacts of the diversions can be appropriately managed and mitigated.

The EM Plan for the project outlines a range of controlled strategies and commitments to manage and mitigate potential impacts on surface water hydrology and geomorphology during construction and operation. I have stated a condition requiring the implementation of an erosion and sediment control plan for all stages of the mining activities on the site (Appendix 2, Schedule F, Condition F28).

8.6.4 Regional water impacts

Assessment methodology

Regional water balance model

An assessment of mine impacts on regional groundwater was conducted for the AEIS using the revised modelled drawdown extents shown in Figure 8.8 to establish the combined groundwater drawdown. This assessment had regard to the project acting in concert with the nearby mining projects (existing Newlands Coal Project (Suttor Creek and Wollombi) and proposed Newlands Coal Extension Project) to the east and south, as well as any potential impact on private landholder bores.

The modelling predicted no private landholder bores, rivers or the palustrine wetland would be impacted by drawdown. Based on this finding, the proponent concluded that a regional water balance model is not warranted for the project as there is only potential for limited combined impacts with known nearby mining projects.

As discussed in the section on surface water in section 8.6.3, the impacts of releases from the project on hydrology and surface water quality of the Suttor River and Kangaroo Creek will be negligible. Therefore, the project will result in a minimal contribution to impacts to surface water caused by combining its releases with those

from the existing Newlands Coal project or the proposed Newlands Coal Extension project. The releases from these projects are and will be controlled in a similar manner through an EA and result in protection of environmental values downstream.

I am aware that in early 2014 DNRM awarded a tender for exploration permits for coal over an extensive area to the west known as coal land release areas CLR2013-2-1 and CLR2013-2-2, which is traversed by the Suttor River. The EPC boundary is adjacent to the western boundary of the project. As the tender had not been decided at the time of preparing the EIS, and no data was available on any future coal project that may proceed in this location, the proponent did not included this potential project in its assessment of water resource impacts. The winning tenderer will be required to apply for an EA before exploration can commence and the approval process for that EA will assess the impacts on water resources.

I have been advised that a quantitative regional or catchment-scale water balance model (regional model) requires specific knowledge of surface and groundwater management and usage, of all potential industries and users (including agricultural) within the region and the conditions under which these vary. This necessitates direct involvement and management from regulators as it would require data collection and full cooperation from those responsible for all industries, projects, towns, councils and agricultural activities in the region, which have the potential to impact surface water.

I am satisfied that it is not possible for the proponent to develop a regional model for the northern Bowen Basin with the information currently publicly available or to further quantify impacts from all other projects as:

- there is insufficient publicly available information on each project.
- there is a high degree of uncertainty about the timing, nature and extent of the activities of other projects
- the data collection required to develop a regional water balance model is beyond the responsibility of a single proponent.

The work to develop a regional model goes beyond the individual proponent responsibility, and I consider this should be the responsibility of the state government as part of its responsibility for overall management of water resources in the region. It is noted that DEHP is currently undertaking investigations within the Fitzroy Catchment to quantify the impacts of combined mining projects on water resources, which will provide an analogous study for comparative purposes.

Water quality objectives

DEHP advises that draft EVs and WQOs are scheduled to be developed by July 2014 across the Burdekin Basin including Suttor sub-basin, Haughton and Don Basins with consultation to be undertaken during October 2014. Final EVs and WQOs would be included in EPP (Water) in 2015. These EVs and WQOs will apply to the project should it be located in the basin to be regulated.

Water monitoring and assessment

Section 17.5.7 of the EIS presented the proponent's groundwater monitoring strategy to be implemented during construction, operations and decommissioning as follows:

- monitoring of project groundwater monitoring bores BYGW01 to BYGW10 quarterly for water level and water quality, providing data on the groundwater in the areas of operation, private landholder bores and regional groundwater
- capturing daily groundwater levels at automatic water level data loggers in BYGWB05, BYGW07A and BYGW09 to enable trend analysis on groundwater level fluctuations
- retrieving groundwater samples during monitoring to allow more robust statistical analysis of water quality and comparison against contaminant trigger limits
- continuing sampling of dedicated groundwater monitoring bores in accordance with the *Water Quality Sampling Manual* produced by the former DERM
- submitting all groundwater samples to a NATA accredited laboratory for analysis
- measuring and recording daily rainfall
- reviewing data from groundwater monitoring bores at minimum six-monthly intervals.

The proponent committed to developing a groundwater monitoring plan, incorporating these strategies and incorporating standards and indicators against which groundwater impacts can be measured.

In response to submissions on project-induced groundwater impacts and issues raised on the groundwater dataset available for analysis during the EIS process, I have conditioned the monitoring of groundwater in Appendix 2, Schedule E. As groundwater-related impacts to the project area are a risk to MNES, I have recommended a condition (Appendix 3, Schedule 5, Recommendation 15) for a groundwater monitoring and management plan (GMMP) to be implemented following referral to DE for review and approval by the Commonwealth Minister for the Environment.

Coordinator-General's conclusion—regional water impacts

I am satisfied that the addition of the project's operations to the Bowen Basin will not have a significant additional impact on the surface and groundwater resource of the basin already in place caused by the combination of existing development projects and mines. A regional water balance model goes beyond the individual proponent responsibility, for reasons outlined above, and I consider this should be the responsibility of the state government as part of its responsibility for overall management of water resources in the region.

DNRM has advised me that it has not prepared a regional scale water balance assessment of the Bowen Basin and has no current policy to do so. Should the government prepare such a model in the future, I would expect the proponent of this and other operational mines in the region to provide relevant data to the State Government for modelling purposes. The results of the modelling to then be made available to the relevant proponents to assist in mine operational planning and mine closure planning to minimise adverse impacts on regional water resources.

8.7 World heritage properties

The project is located within the Rosella Creek and Upper Suttor River sub-catchments of the Bowen River catchment and Suttor River catchment respectively. These

catchments constitute part of the headwaters of the Burdekin Basin. The Burdekin Basin comprises a number of major sub-catchments, namely the Bowen River, Lower Burdekin River, Upper Burdekin River and Suttor River catchments and enters the Pacific Ocean and Great Barrier Reef World Heritage Area (GBRWHA) just south of Ayr (refer Chapter 15, Figure 15-1 of the EIS). The Rosella Creek and Upper Suttor River sub-catchments form a minor portion of the total Burdekin Basin catchment.

It will be necessary for the project to release water to the environment to balance the mine water inventory. This will be achieved through a controlled release strategy allowing discharge into waterways when specific release criteria have been satisfied (refer Chapter 8 of the EIS). Release criteria were developed by the proponent to ensure that releases do not result in unacceptable water quality in the receiving environment and considered several key factors to ensure this objective is met, including receiving environment flow, receiving environment water quality, mine release rate and mine release water quality.

Adherence to the proponent's release strategy and stated conditions in Appendix 2, Schedule F will protect the environmental values and objectives for water quality within the sub-catchment areas, resulting in no impact to surface water quality. As the sub-catchment input constitutes a minor portion of the overall input to the Great Barrier Reef (GBR) from the Burdekin Basin catchment, the proponent expects impacts to the GBR from mine water releases from this project to be minimal.

The design of the water management strategy for the project will mitigate the risk of unplanned discharges to the environment. I require the design capacity of the water management system and the proponent's risk mitigation measures, especially during high rainfall periods when there is also likely to be high flows in the receiving environment, to achieve the outcome of no unplanned releases during the life of the mine. Consequently I am satisfied that there will be no impact of unplanned releases on the GBRWHA.

8.8 Ecologically sustainable development

8.8.1 Principles

My assessment of the project has taken into account the principles of ecologically sustainable development, which as defined in Part 1, section 3A of the EPBC Act, are:

- **the integration principle**: decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- **the precautionary principle**: if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- **the inter-generational equity principle**: the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- **the biodiversity principle**: the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making

- **the valuation principle**: improved valuation, pricing and incentive mechanisms should be promoted.

I have considered the above principles in my evaluation of project impacts. Based on the completion of a comprehensive environmental assessment process, proponent commitments and EM Plan, my stated conditions for the draft EA for the project (Appendix 2) and my recommendations for conditions to be placed on subsequent State and Commonwealth approvals, I am satisfied that the project complies with the provisions of Part 1, section 3A of the EPBC Act in accordance with the following criteria.

The integration principle

This report is the culmination of a three-year assessment process addressing economic, environmental, social and equitable considerations. Two stages of this process have involved public consultation and all submissions received have been considered as part of the consultation process.

All long-term and short-term impacts for the mine will be managed through an EA which will be administered by DEHP (conditions to be applied are in Appendix 2).

I consider that through compliance with my conditions (Appendices 1, 2 and 3) and implementation of all proposed management measures, the long-term and short-term economic, environmental and social impacts of the project are equitable and acceptable.

The precautionary principle

Based on the proponent's EIS documentation, submissions made on this documentation and advice received from advisory agencies, I am satisfied that there is sufficient scientific information to conclude there will not be an unacceptable impact to the controlling provisions of the project.

Where I consider there is insufficient information to support the proponent's assessment conclusions, I have taken a conservative approach to documenting impact estimates. For example, I have adopted a worst-case scenario for assessing potential impacts to Ornamental snake habitat. Subsequently these conservative assumptions have informed my recommendations for maximum disturbance areas for the project as identified in Appendix 3, Schedule 5, Recommendation 13.

I have adopted a precautionary approach to conditioning to supplement the proponent's proposed management measures and provide upfront and ongoing monitoring to increase the scientific understanding of potential impacts to MNES. These include, but are not limited to:

- conditions for the proponent to complete a groundwater monitoring program to ensure adequate scientific understanding and to inform conditioning of thresholds for groundwater level and quality fluctuations in the final EA (Appendix 2, Schedule E)
- recommendations to identify unforeseen impacts to groundwater requiring groundwater level monitoring in the palustrine wetland
- a recommendation for the updating of the Byerwen Coal project groundwater model

- conditions requiring the proponent to conduct a second stygofauna sampling program in groundwater bores prior to the commencement of dewatering activities to confirm the species present in the groundwater
- conditions for the development of a REMP to identify, describe and monitor adverse impacts to receiving waters (Appendix 2, Schedule F).

The inter-generational equity principle

I am satisfied that the inter-generational equity principle has been adequately applied throughout my evaluation of the project and throughout my conditioning. I consider that the conditions for the project (Appendices 3 and 4) will allow for the project to be constructed, operated, rehabilitated and closed in a sustainable manner so as to protect MNES and the local environment for future generations.

In particular, my condition for all reasonable and practicable measures to be taken by the proponent to minimise the size of the voids remaining after mining activities cease will reduce the area of pit lake voids which would otherwise require ongoing management and rectification by future generations.

My condition for a financial assurance as security for compliance with the EA will result in future generations not being burdened by failure of the proponent to undertake mine rehabilitation and mine closure in a sustainable manner. The proponent will provide a financial-assurance for the decommissioning and rehabilitation costs associated with disturbances and relinquishment of this will only occur once the regulator at the time is satisfied that the rehabilitation is successful. My recommendation to require offsets for those ecological communities which will be strip cleared for open-cut pits will assist the preservation of ecological diversity both locally and nationally.

The biodiversity principle

The TOR that I developed for the project[37] outlined the requirements for the proponent's EIS, including considerations of biodiversity conservation and ecological integrity. The biodiversity principle has been carried throughout all stages of the three-year EIS process in both the proponent's assessment documentation and my evaluation.

I am satisfied that this principle has been adequately incorporated into my conditions for an EA for the project (Appendix 2) and my recommended biodiversity conditions to the Commonwealth Minister for the Environment. In addition, the proponent commitments and control strategies contained in the EM Plan will mitigate or offset residual impacts to biodiversity and ecological communities.

The valuation principle

I am satisfied that adverse impacts of the project on the environment will be suitably compensated through environmental biodiversity offsets for all unavoidable residual significant impacts (refer to section 8.4 of this report, the proponent's offsets strategy in Chapter 21 of the EIS and my conditions in Appendix 2, Schedule H and Appendix 3, Schedule 5 for information on offsets). I consider that the cost of both direct and

[37] For a copy of the TOR and other assessment documentation, refer to www.dsdip.qld.gov.au**/byerwencoalproject**

indirect offsets will be commensurate with the potential impacts on MNES and the environment generally.

8.9 Social and economic impacts

In accordance with the TOR, the proponent completed a social impact assessment (SIA) for the project. This identified potential impacts and the proponent's responses and mitigation measures in relation to housing and accommodation, workforce management, health and community wellbeing, community and stakeholder engagement and local business and industry content (EIS, Volume 3, Appendix 10).

The SIA identified potential adverse impacts requiring enhancement, mitigation, management and monitoring relating to:

- increased temporary and permanent accommodation requirements
- increased demand on health existing social infrastructure facilities and services
- road safety concerns due to increased traffic on local roads and highways
- contribution to the regional skills shortages
- health and safety concerns
- increased cost of living
- need to engage with local community.

In response, the proponent has committed to a range of actions to avoid, mitigate and manage social impacts including:

- all temporary and permanent housing will be provided through investment by QCoal
- stakeholder and community collaboration and negotiation as part of the development and implementation of programs, plans and procedures to address a range of specific impacts identified by the SIA
- adoption of the Queensland Resources and Energy Sector Code of Practice for local content and implementation of strategies to promote, engage, encourage and build capacity for local service providers and business
- maximising local employment opportunities, including under represented and disadvantaged groups and providing training and development opportunities for people locally and regionally.

The SIA found that this project will continue to present challenges for the local and regional community. Based on the assessment, the proponent's strategies to mitigate, manage and monitor impacts and my imposed condition (Appendix 1,Condition 2), I am satisfied that the social and local economic impacts can be appropriately managed over the life of the project to ensure appropriate outcomes and opportunities can be generated to support the local and regional community.

My condition requires the proponent to provide an annual report to the Coordinator-General for a period of five years from the commencement of construction and should also include any operational activities undertaken during this period. This report should describe the actions, outcomes and adaptive management strategies to:

- avoid, manage or mitigate project related impacts on local and regional housing markets
- enhance local employment, training, and development opportunities
- avoid, manage or mitigate project-related impacts on local community services, social infrastructure and community safety and wellbeing
- inform the community about project impacts and show that community concerns have been taken into account when reaching decisions.

Refer to section 6 of this report for more detailed social and local economic assessment which outlines the specific mitigation and management measures in accordance with the Queensland Government's social impact assessment guideline. The proponent's responses to potential impacts identified through consultation during and after the EIS processes are summarised in the social impact assessment action plans in Appendix 4 of this report.

8.10 Coordinator-General's overall conclusions

I have reviewed all of the assessment documentation provided and I am satisfied that the proponent has adequately assessed any potential impacts on the controlling provisions under the EPBC Act as a result of the project. The proponent has provided information on mitigation measures, control strategies and monitoring programs throughout the project EM Plan and the combined EIS and AEIS proponent commitments list (March 2014) (Appendix 6) to ensure any potential adverse impacts are avoided, minimised and managed and offsets are provided for residual impacts. My conditions in appendices 1 and 2 and my recommended conditions outlined in Appendix 3 will supplement these measures, strategies and programs to ensure the requirements of the EPBC Act are met.

I consider that the requirements of the bilateral agreement have been satisfied. Based on my conclusions for each of the respective controlling provisions as discussed above, I am satisfied that the project would not result in unacceptable significant impacts on MNES.

9. Conclusion

The Byerwen Coal project has undergone a comprehensive environmental impact assessment. In undertaking my evaluation of the EIS, I have considered the following:

- the EIS and AEIS prepared for this project
- submissions on the EIS and AEIS, including agency advice
- additional documentation provided to the Coordinator-General by the proponent as requested.

I am satisfied that the requirements of the SDPWO Act have been met and that sufficient information has been provided to enable the necessary evaluation of potential impacts, and the development of mitigation strategies and conditions of approval.

The environmental assessment commenced with the declaration of this project on 1 March 2011 and has involved a comprehensive body of work by the proponent. More detailed work will continue to be undertaken in the detailed design phase of the project.

The potential impacts identified in the EIS documentation and submissions have been assessed. I consider that the mitigation measures adopted by the proponent and required by the conditions stated in this report would result in acceptable overall outcomes.

Based on the information provided by the proponent and outlined in section 6.2, I conclude that the project would deliver economic benefits to both the local, regional and state economies. Employment benefits would be generated by the project over the 50-year project life providing direct and indirect jobs, local, regional and Indigenous employment opportunities. The project would also contribute to state and federal government revenue through taxes and royalties.

Accordingly, I approve the Byerwen Coal project, subject to the conditions and recommendations in appendices Appendix 1, Appendix 2 and Appendix 3. In addition, I expected that the proponent's commitments will be fully implemented as presented in the EIS documentation and summarised in Appendix 6 of this report.

To proceed further, the proponent will be required to:

- obtain EPBC Act approval
- obtain a range of State government approvals required for the project
- finalise and implement the a range of management plans
- finalise the Biodiversity Offsets Strategy.

If there are any inconsistencies between the project (as described in the EIS documentation) and the conditions in this report, the conditions shall prevail. The proponent must implement all the conditions of this report.

Section 8 of this report describes the extent to which the material supplied by Byerwen Coal Pty Ltd addresses the actual or likely impacts on MNES of each controlled action for the project.

Copies of this report will be issued to:

- DE
- DEHP
- DNRM
- DTMR

A copy of this report will also be available on the Department of State Development, Infrastructure and Planning's website at **www.dsdip.qld.gov.au/coordinator-general**

Acronyms and abbreviations

Acronym	Definition
µg/L	Micrograms per litre
µS/cm	microsiemens per centimetre
AADT	average annual daily traffic
ACA	Aquatic Conservation Assessment
ACARP	Australian Coal Association Research Program
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AEIS	Additional information to the environmental impact statement
AHD	Australian Height Datum
ALCAM	Australian level crossing assessment model
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	Average Reoccurrence Interval
AS/NZS	Australian Standard/New Zealand Standard
AUL(S)	auxiliary left turn lane treatment
BCA	Building Codes Australia
BIBO	bus in bus out
BOMP	biodiversity offset management plan
BPA	biodiversity planning assessment
BTF	Black-throated finch
CDMP	coal dust management plan
CHMP	cultural heritage management plan
CHPP	Coal handling and preparation plant
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CHR	channelized right turn treatment
CMHS Act	*Coal Mine Health and Safety Act 1999*
CO_2-e	carbon dioxide equivalent
COAG	Council of Australian Governments
CQU	Central Queensland University
DATSIMA	Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
dB(A)	decibels measured at the 'A' frequency weighting network
DE	Australian Government Department of the Environment
DEHP	Department of Environment and Heritage Protection
DETE	Department of Education, Training and Employment
DEWHA	Department of the Environment, Water, Heritage and the Arts
DIDO	Drive in drive out
DMP	Damage mitigation permit
DNRM	Department of Natural Resources and Mines
DOA	Deed of Agreement
DSA	design storage allowance

Acronym	Definition
DSDIP	Department of State Development, Infrastructure and Planning
DTMR	Department of Transport and Main Roads (Qld)
EA	environmental authority
EEM	ecological equivalence methodology
EEO Act	Energy Efficiency Opportunities Act 2006 (Cwlth)
EHP	Department of Environment and Heritage Protection
EIS	environmental impact statement
EM Plan	environmental management plan
EOP	environmental offsets policy
EPA	Western Australian Environmental Protection Authority
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPC	exploration permit for coal
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity
ERP	emergency response plan
ESA	environmentally sensitive area
ESAs	equivalent standard axles
ESCP	erosion and sediment control plan
ESP	exchange sodium percentage
EV	environmental values
FID	financial investment decision
FIFO	fly-in fly-out
FPC	foliage protective cover
FTE	full-time equivalent
GAB	Great Artesian Basin
GAP	Goonyella to Abbot Point
GARID	Guideline for Assessment of Road Impacts of Development
GBDS	Galilee Basin Development Strategy
GBR	Great Barrier Reef
GDE	groundwater dependant ecosystem
GHG	greenhouse gas
GMMP	Groundwater Monitoring and Management Plan
Ha	hectare(s)
HES	high ecological significance
HRA	hazard and risk assessment
HV	heavy vehicle
HVR	high value regrowth

Acronym	Definition
IAS	initial advice statement
IECA	International Erosion Control Association Australasia
ICH	indigenous cultural heritage
ICN	Industry Capacity Network
IESC	Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Developments
IRC	Isaac Regional Council
km	kilometres
JAMBA	Japan–Australia Migratory Bird Agreement
kPa	Kilopascal
LAIP	Local area infrastructure program
L_{A1}	those noise levels that are exceeded for one per cent of each one-hour sample period
L_{Aeq}	the average A-weighted sound pressure level of a continuous steady sound that has the same mean square sound pressure as a sound level that varies with time
L_{Amax}	the maximum average A-weighted sound pressure measured over a specified period of time
LAN,T	statistical descriptor for the variation of noise
Land Act	Land Act 1994 (Qld)
LGA	local government area
LG Act	Local Government Act 2009 (Qld)
L/s	Litres per second
m	Metres
m.btoc	Metres Below Top of Casing
MCU	material change of use
mg/L	milligrams per litre of liquid/gaseous liquid
MIA	Mine Infrastructure Areas
MIBC	Methyl Isobutyl Carbinol
ML	Megalitres
MLA	Mining lease application
MLpa	ML per annum
MNES	matters of national environmental significance
MR Act	*Mineral Resources Act 1989* (Qld)
MSDS	Material Safety Data Sheet
Mt	Million tonnes
Mtpa	million tonnes per annum
MW	megawatt
NATA	National Association of Testing Authorities
NC Act	*Nature Conservation Act 1992* (Qld)
NICH	Non indigenous cultural heritage
NML	Northern Mission Link

Acronym	Definition
NT Act	*Native Title Act 1993*
NTU	Nephelometric Turbidity Unit
NPA	national partnership agreement on coal seam gas and large coal mining developments
OAMP	offset area management plan
PAA	Priority Agricultural Areas
PAWC	plant available water capacity
PIA	pavement impact assessment
PM_{10}	particulate matter with equivalent aerodynamic diameter less than 10μm
$PM_{2.5}$	particulate matter with equivalent aerodynamic diameter less than 2.5μm
PMF	probably maximum flood
PPE	personal protective equipment
PPV	peak particle velocity, which is a measure of ground vibration magnitude and is the maximum instantaneous particle velocity at a point during a given time interval in mms^{-1}
QBOP	Queensland Biodiversity Offset Policy 2011
QFRS	Queensland Fire and Rescue Service
QGEOP	Queensland Government Environmental Offsets Policy
QH	Queensland Health
QH Act	*Queensland Heritage Act*
RE	regional ecosystem
REMP	receiving environment monitoring program
RIA	road impact assessment
RP	release point
RMP	road-use management plan
RMP	rehabilitation management plan
ROM	run of mine
RPEQ	Registered Professional Engineer of Queensland
RPI Act	Regional Planning Interests Act
SCL	strategic cropping land
SCL Act	*Strategic Cropping Land Act 2011 (Qld)*
SCMA	Strategic cropping management area
SDA	state development area
SDPWO Act	*State Development and Public Works Organisation Act* 1971 (Qld)
SDWPO Regulation	State Development and Public Works Organisation Regulation (Qld)
SEG	stakeholder engagement group
SEVT	Semi -evergreen vine thickets
SIA	social impact assessment
SIAU	Social Impact Assessment Unit
SIMP	social impact management plan

SMP	species management program
SO_4^{2-}	Sulphate
SPA	*Sustainable Planning Act 2009* (Qld)
SPRAT	Species Profiles and Threats Database
SQP	suitably qualified person
STP	Sewage treatment plant
TAP	Threat abatement plan
TAPM	The air pollution model
TECs	Threatened ecological communities
TDS	total dissolved solids
TIA	Transport Infrastructure Act 1994 (Qld)
TLF	train load out facility
TMP	transport management plan
TOR	terms of reference
TSP	total suspended particles
VM Act	*Vegetation Management Act 1999* (Qld)
Water Act	Water Act 2000 (Qld)
WIWD	Whitsunday Industrial Workforce Development
WQOs	Water quality objectives
WRC	Whitsunday Regional Council

Glossary

Term	Definition
Alluvium	Deposits of sediment composed of gravel, sand, silt or clay deposited in river channels or on floodplains. Alluvial aquifers are shallower than sedimentary aquifers and fractured rock aquifers and water levels often fluctuate due to varying recharge and pumping rates.
assessment manager	For an application for a development approval, means the assessment manager under the *Sustainable Planning Act 2009* (Qld).
average recurrence interval (ARI)	The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.
bilateral agreement	The agreement between the Australian and Queensland governments that accredits the State of Queensland's EIS process. It allows the Commonwealth Minister for the Environment to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).
brackish	Brackish water is more saline or salty than freshwater, but not as much as seawater.
co-disposal dam	A dam which contains combined tailings products with course waste rock material and waste mud.
commencement of construction	Physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project.
construction areas	The construction worksites, construction car parks, and any areas licensed for construction or on which construction works are carried out.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).
controlling provision	The matters of national environmental significance, under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), that the proposed action may have a significant impact on.
coordinated project	A project declared as a ' coordinated project' under section 26 of the SDPWO Act. Formerly referred to as 'significant projects'.
drawdown	The distance between the static water level and the surface of the cone of depression
Coordinator-General	The corporation sole constituted under section 8A of the State Development and Public Works Organisation Act 1938 and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
endangered	'Endangered', in relation to wildlife, means the wildlife falls within a description mentioned in section 77 of the *Nature Conservation Act 1992.*

environment	As defined in Schedule 2 of the SDPWO Act, includes: a) ecosystems and their constituent parts, including people and communities b) all natural and physical resources c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).
environmental effects	Defined in Schedule 2 of the SDPWO Act as the effects of development on the environment, whether beneficial or detrimental.
environmentally relevant activity (ERA)	An activity that has the potential to release contaminants into the environment. Environmentally relevant activities are defined in Part 3, section 18 of the *Environmental Protection Act 1994* (Qld).
financial assurance:	Financial assurance is a type of financial security provided to the Queensland Government by the holder of an environmental authority. Financial assurance provides the government with a financial security to cover any costs or expenses incurred in taking action to prevent or minimise environmental harm or rehabilitate or restore the environment should the holder fail to meet their obligations in the EA.
gilgai	Natural soil formation characterised by an undulating surface of gentle mounds and depressions associated with swelling and cracking clay soils on alluvial floodplains.
groundwater sink:	In the context of final voids, a hydrogeological scenario where the water level in the final void lake is lower than the level of the groundwater in the surrounding strata, creating a gradient into the void and preventing flow of water from the void lake into the surrounding strata.
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for the condition.
initial advice statement (IAS)	A scoping document, prepared by a proponent, that the Coordinator-General considers in declaring a coordinated project under Part 4 of the SDPWO Act. An IAS provides information about: • the proposed development • the current environment in the vicinity of the proposed project location • the anticipated effects of the proposed development on the existing environment • possible measures to mitigate adverse effects.
matters of national environmental significance	The matters of national environmental significance protected under the *Environment Protection and Biodiversity Conservation Act 1999*. The eight matters are: a) world heritage properties b) national heritage places c) wetlands of international importance (listed under the Ramsar Convention) d) listed threatened species and ecological communities e) migratory species protected under international agreements f) Commonwealth marine areas g) the Great Barrier Reef Marine Park h) nuclear actions (including uranium mines).

mean steady state water level in final void	The mean steady state water level is representative of the predicted mean water level (of all realisations run by a model) once the water level has reached a steady state. A 'steady state' is a stable condition that does not change over time. (Meaning taken from proponent's EIS).
micro-habitat	The habitat features of a particular site.
nominated entity (for an imposed condition for undertaking a project)	An entity nominated for the condition, under section 54B(3) of the SDPWO Act.
non-irrigated broadacre cropping	farming practices that rely on rainfall for water, as opposed to irrigation, for example from a nearby water source, such as a river.
perched	A perched water table is a Geographical term used to describe an accumulation of groundwater that is above the water table in the unsaturated zone. A perched water table forms above an impermeable rock or clay layer that separates it from the main groundwater table below it.
probable maximum flood	Flooding associated with the Probable Maximum Precipitation.
plan of operations	A plan of operations for a mining lease provides details about how an environmental authority holder intends to meet the environmental authority conditions, including rehabilitation requirements. The plan includes any plan of operations submitted to the administering authority for a proposed mining lease substantially the same as the mining lease. The plan must be comply with section 234 of the EP Act (pre March 2013).
project area	The area for the proposed Byerwen Coal project assessed in this report. The project area is bounded by the mining lease application (MLA) areas MLA 10355, MLA 10356, MLA 10357, MLA 70434, MLA 70435, MLA 70436.
project construction	project construction works and means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project. It does not include pre-construction work assessment investigations and surveys.
project disturbance footprint	The total project disturbance area including waste rock dumps, open pit working areas, MIAs, haul roads and rail.
properly made submission (for an EIS or a proposed change to a project)	Defined under section 24 of the SDPWO Act as a submission that: a) is made to the Coordinator-General in writing b) is received on or before the last day of the submission period c) is signed by each person who made the submission d) states the name and address of each person who made the submission e) states the grounds of the submission and the facts and circumstances relied on in support of the grounds.
proponent	The entity or person who proposes a coordinated project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.

rehabilitation hierarchy	The rehabilitation hierarchy in order of decreasing capacity to prevent or minimise environmental harm is: • avoid disturbance that will require rehabilitation • reinstate a 'natural' ecosystem as similar as possible to the original ecosystem • develop an alternative outcome with a higher economic value than the previous land use • reinstate the previous land use (eg. Grazing or cropping) • develop lower value land use • leave the site in an unusable condition or with a potential to generate future pollution which would affect environmental values.
regional groundwater table	The assumed level (elevation) of groundwater within geological strata in the surrounding regions.
remnant vegetation	Any patch of vegetation in which the original structure and plant species composition of the vegetation remains largely intact or undisturbed.
riparian	Of or on a riverbank.
run of mine coal	The coal delivered from the mine to the coal preparation plant is called run-of-mine, or ROM, coal. This is the raw material before processing, and consists of coal, rocks, middlings, minerals and contamination
significant impact under Significant Impact Guideline for MNES	A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.
significant project	A project declared (prior to 21 December 2012) as a 'significant project' under section 26 of the SDPWO Act. Projects declared after 21 December 2012 are referred to as 'coordinated projects'.
significant project construction	Significant project construction works means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project. It does not include pre-construction work assessment investigations and surveys.
significant project traffic	Significant project traffic means an increase in project traffic equal to or greater than 5 per cent in either traffic numbers (AADT) or axle loadings (ESAs), as outlined in the GARID.
stated condition	Conditions stated (but not enforced by) the Coordinator-General under sections 39, 45, 47C, 49, 49B and 49E of the SDPWO Act. The Coordinator General may state conditions that must be attached to a: • development approval under the Sustainable Planning Act 2009 • proposed mining lease under the Mineral Resources Act 1989 • draft environmental authority (mining lease) under Chapter 5 of the Environmental Protection Act 1994 (EPA) • proposed petroleum lease, pipeline licence or petroleum facility licence under the Petroleum and Gas (Production and Safety) Act 2004 • non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EPA.

suitably qualified person	Suitably qualified and experienced person' is defined in Part 3, section 564 of the Environmental Protection Act 1994.
tailings	Tailings consist of ground rock and process effluents that are generated in a mine processing plant. The waste stream that remains after available valuable product is extracted is known as tailings.
taxa	The plural of taxon, which means any taxonomic category, as species, genus.
threat abatement plans	Threat abatement plans establish a national framework to guide and coordinate Australia's response to key threatening processes registered under the EPBC Act. The Commonwealth Minister for the Environment decides if a threat abatement plan should be made or adopted. A plan provides for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. Implementing the plan should assist the long term survival in the wild of affected native species or ecological communities. A list of plans is available at: www.environment.gov.au/topics/biodiversity/threatened-species-ecological-communities/threat-abatement-plans/approved-threat.
works	Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that: a) the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body is or may be authorised under any Act to undertake, or b) is or has been (before or after the date of commencement of this Act) undertaken by the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body under any Act, or c) is included or is proposed to be included by the Coordinator-General as works in a program of works, or that is classified by the holder of the office of Coordinator-General as works.

Appendix 1. Imposed conditions

This appendix includes conditions imposed by the Coordinator-General under section 54B of the SDPWO Act[38].

All of the conditions imposed in this appendix take effect from the date of this Coordinator-General's report. In accordance with section 54B(3) of the SDPWO Act, I have nominated the entities to have jurisdiction for monitoring compliance with these conditions.

Condition 1. Environmental Offsets

The Coordinator-General is to have jurisdiction for this condition.

(a) The proponent must prepare a biodiversity offset strategy that:

- (i) Is consistent with the draft offset strategy prepared for the project environmental impact statement and addresses significant residual impacts to environmental values identified in the environmental impact statement
- *(ii)* Details how the offset requirements conditioned by the Commonwealth Minister for the Environment in the approval for the project under the *Environment Protection and Biodiversity Conservation Act 1999* will be delivered
- (iii) Details proposed offsets to address any significant residual impacts for matters of state environmental significance consistent with (a)(ii) (if required)
- (iv) Takes account of the results of any pre-clearance surveys undertaken and the amended RE Mapping provided in the Queensland Herbarium's assessment report.

(b) The offset strategy is to include, but not be necessarily limited to:

- (v) a detailed description of the land to which the plan relates, the values affected and the extent and likely timing of impact on each
- (vi) evidence that values to be impacted can be offset
- (vii) the offset delivery mechanism(s) comprising one or more of: land-based offsets; direct benefit management plans; offset transfers and/or offset payments
- (viii) a legally binding mechanism that ensures protection and management of offset areas.

(c) The proposed offset strategy must be lodged with the Coordinator-General for approval within 60 days of the proponent receiving notification of the approval under the EPBC Act and prior to commencement of construction activities

(d) The approved offset strategy must be implemented in accordance with condition H16 of the project environmental authority under the EP Act, or as directed by the Coordinator-General.

[38] For a definition of 'imposed conditions', refer to the Glossary on page 161 of this report.

Condition 2. Social impacts

The Coordinator-General is to have jurisdiction for this condition.

(a) The proponent must provide an annual report to the Coordinator-General for a period of five years from the commencement of construction. The report should describe the actions, outcomes and adaptive management strategies:

  (i) to avoid, manage or mitigate project-related impacts on local and regional housing markets.

  (ii) to enhance local employment, training and development opportunities.

  (iii) to avoid, manage or mitigate project-related impacts on local community services, social infrastructure and community safety and wellbeing.

  (iv) to inform the community about project impacts and show that community concerns about project impacts have been taken into account when reaching decisions.

The annual report should also report on actions and management strategies addressing direct impacts arising from operational activities undertaken during the five year reporting period. The report is to document the current and proposed level of fly-in fly-out (FIFO) workforce and management of any impacts caused by the FIFO approach. It will be made publicly available on the Coordinator-General's website.

Appendix 2. Stated conditions—mine environmental authority

This appendix includes the Coordinator-General's stated conditions for the draft environmental authority (mining lease) for the Byerwen Coal project under the *Environmental Protection Act 1994* and are stated pursuant to section 47C of the *State Development and Public Works Organisation Act 1971*.[39]

The appendix is structured as follows:

Schedule A – General

Schedule B – Air

Schedule C – Waste management

Schedule D – Noise and vibration

Schedule E – Groundwater

Schedule F – Water

Schedule G – Sewage treatment

Schedule H – Land and rehabilitation

Schedule J – Dams and levees

Figures

Definitions

Table BY1: Rehabilitation Completion Criteria

Schedule A - General

A1 **Coal extraction**

The environmental authority holder is approved for an extraction rate of up to 15Mtpa (million tonnes per annum) of ROM (run-of-mine) coal.

A2 This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.

A3 In carrying out the mining activity authorised by this environmental authority, disturbance of land on **Figure 1- Site map, domains and groundwater monitoring locations**:

a) may occur in the areas marked 'A';

b) must not occur in the areas marked 'B';

c) may occur in the areas marked 'C', but only in accordance with condition A4.

A4 Any disturbance within the areas marked 'C' on **Figure 1- Site map, domains and groundwater monitoring locations**:

[39] For a definition of 'stated conditions', refer to the Glossary on page 161 of this report.

a) is only authorised to the extent reasonably necessary for a road, fence, underground service, low-impact telecommunications facility, electrical sub-station, transmission grid works and supply network works, storage depots, similar minor infrastructure and ancillary facilities for any of the above minor infrastructure;

b) any disturbance within areas marked 'A' or 'C' is not to impact adversely on areas marked 'B'.

A5 The holder of this environmental authority must:

a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;

b) maintain such measures, plant and equipment in a proper and efficient condition;

c) operate such measures, plant and equipment in a proper and efficient manner;

d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.

A6 Monitoring

Except where specified otherwise in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than 5 years.

A7 Financial assurance

The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

A8 The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.

A9 Risk management

The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirements of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian Standard for risk management, to the extent relevant to the environmental management, prior to the commencement of mining activities.

A10 Notification of emergencies, incidents and exceptions

The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.

A11 Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following:

a) results and interpretation of any samples taken and analysed;

b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and

c) proposed actions to prevent a recurrence of the emergency or incident.

A12 Complaints

The holder of this environmental authority must record all environmental complaints received about the mining activities including the following details:

a) name, address and contact number for/of the complainant;

b) time and date of complaint;

c) reasons for the complaint;

d) investigations undertaken;

e) conclusions formed;

f) actions taken to resolve the complaint;

g) any abatement measures implemented; and

h) person responsible for resolving the complaint.

A13 The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.

A14 Third party reporting

The holder of this environmental authority must:

a) within 1 year of the commencement of this authority, obtain from a suitably qualified and experienced third party a report on compliance with the conditions of this environmental authority;

b) obtain further such reports at regular intervals not exceeding three years from the completion of the report referred to above; and

c) provide each report to the administering authority within 90 days of its completion.

A15 Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must:

a) comply with the amended or changed standard, policy or guideline within 2 years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures referred to in Schedule J - Dams and Levees the time specified in that condition;

b) until compliance with the amended or changed standard, policy or guideline is achieved; continue to remain in compliance with the corresponding

provision that was current immediately prior to the relevant amendment or change.

Schedule B - Air

B1 Dust nuisance

The release of dust or particulate matter (or both) resulting from the mining activity must not cause an environmental nuisance at any nuisance sensitive or commercial place.

B2 The holder of the environmental authority shall ensure that dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place:

a) dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter— Deposited matter – Gravimetric method;

b) a concentration of total particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—Total suspended particulate matter (TSP)— High volume sampler gravimetric method;

c) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of either:

i. Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—PM_{10} high volume sampler with size-selective inlet – Gravimetric method; or

ii. Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM_{10} low volume sampler— Gravimetric method; or

iii. Any alternative method of monitoring PM_{10} which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by Queensland Department of Environment and Heritage Protection (EHP).

NOTE*: The exceedances of PM_{10} above 50 micrograms per cubic metre over a 24-hour averaging time as a result of bushfires, dust storms and fuel reduction burning for fire management purposes are not considered to be a breach of Condition B2 b).*

Schedule C – Waste Management

C1 Burning waste

Unless otherwise permitted by the conditions of this environmental authority, or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.

C2 The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided that the activity does not cause environmental harm at any sensitive place or commercial place.

C3 Tailings disposal

Tailings must be managed in accordance with procedures contained within the current plan of operations. These procedures must include provisions for:

a) containment of tailings;

b) the management of seepage and leachates both during operation and the foreseeable future;

c) the control of fugitive emissions to air;

d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings;

e) maintaining records of the relative locations of any other waste stored within the tailings;

f) rehabilitation strategy;

g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

Schedule D – Noise and vibration

D1 The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the criteria in **Table D1 – Noise limits** to be exceeded at a sensitive place or commercial place.

Table D1 – Noise limits

Noise level measured in dB(A)	Monday to Saturday			Sunday and Public Holidays		
	7am-6pm	6pm-10pm	10pm-7am	9am-6pm	6pm-10pm	10pm-9am
	Noise measured at a nuisance sensitive place					
$LA_{eq\ adj,T}$	Cerito 36 Others 28	Cerito 30 Others 28	Cerito 28 Others 28	Cerito 36 Others 28	Cerito 30 Others 28	Cerito 28 Others 28
$LA_{1adj,T}$	Cerito 41 Others 33	Cerito 35 Others 33	Cerito 33 Others 33	Cerito 41 Others 33	Cerito 35 Others 33	Cerito 33 Others 33
	Noise measured at a commercial place					
$LA_{eq\ adj,T}$	Background Plus 10	Background Plus 10	Background Plus 10	Background Plus 10	Background Plus 10	Background Plus 10

NOTE:

Associated notes and requirements:

1. *"Cerito" means Cerito Station Homestead.*
2. *"Others" means Byerwen station homestead and all other noise sensitive places.*
3. *Monitoring period T shall be 15 minutes.*
4. *"Background" means background noise level, measured in the absence of the noise under investigation, as $LA_{90,}T$ being the A-weighted sound pressure level exceeded for ninety (90) per cent of the time period of 15 minutes, using Fast response.*
5. *"$\boldsymbol{LA_{eq\ adj,T}}$" means the equivalent continuous A-weighted sound pressure level, adjusted for noise character, measured in the presence of the noise under investigation over a time period of 15 minutes, using Fast response.*

6. *"**LA1** $_{adj,T}$" means the A-weighted sound pressure level, adjusted for noise character, measured in the presence of the noise under investigation and exceeded for one (1) per cent of the time period of 15 minutes, using Fast response.*

D2 The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in **Table D2 – Blasting noise limits** to be exceeded at a sensitive place or commercial place.

Table D2 – Blasting noise limits

Blasting noise limits	Sensitive or commercial blasting noise limits place limits	
	Daytime 7am to 6pm	Evening/Night/Early Morning 6pm to 7am
Airblast overpressure	115dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time	No blasting is allowed during these times
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10mm/second peak particle velocity at any time	No blasting is allowed during these times

D3 Noise monitoring and recording must include the following descriptor characteristics and matters:

a) $LA_{N,T}$ (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins);

b) background noise $L_{A90,T}$;

c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;

d) atmospheric conditions including temperature, relative humidity and wind speed and directions;

e) effects due to any extraneous factors such as traffic noise;

f) location, date and time of monitoring;

g) if the complaint concerns low frequency noise, Max $Lp_{Z,T}$ and one third octave band measurements in dBZ for centre frequencies in the 10 – 200Hz range.

D4 The holder of this environmental authority must develop and implement a blast monitoring program to monitor compliance with **Table D2 – Blasting noise limits** for:

a) at least 50 per cent of all blasts undertaken on this site in each month at the nearest and most affected sensitive place(s) or commercial place(s);

b) all blasts conducted during any time period specified by the administering authority at the nearest and most affected sensitive place(s) or commercial place(s) or another such place to investigate an allegation of environmental nuisance caused by blasting.

D5 Low frequency noise

Noise emissions from the activity, when including substantial low frequency noise, must not cause an overall sound pressure level at a noise sensitive place exceeding 55 dBZ.

NOTE: "Substantial low frequency noise" means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurements, with a predominant component located within the frequency range 10 to 200 Hz.

Schedule E – Groundwater

E1 The holder of this environmental authority must not release contaminants to groundwater.

E2 All determinations of groundwater quality and biological monitoring must be performed by an appropriately qualified person.

E3 Groundwater quality

Groundwater quality and levels must be monitored at the locations and frequencies described in **Table E1 - Groundwater monitoring locations and frequency** and **Figure 1- Site map, domains and groundwater monitoring locations** for quality characteristics identified in **Table E2 - Groundwater quality triggers.**

Table E1 - Groundwater monitoring locations and frequency

Monitoring Point	Location		Surface RL (m)[2]	Monitoring Frequency[1]
	Latitude (GDA94 – Zone 54)	Longitude (GDA94 – Zone 54)		
Groundwater Monitoring Reference[3] Bores				
BYGW02	-21.21175	147.85975	288.505	Quarterly
BYGW05	-21.35900	147.85187	301.311	Quarterly
BYGW06	-21.28224	147.91740	314.946	Quarterly
Groundwater Compliance Bores				
BYGW01	-21.12792	147.89980	232.12	Quarterly
BYGW03	-21.28558	147.89096	304.939	Quarterly
BYGW04	-21.31966	147.88707	299.773	Quarterly
BYGW07A	-21.18642	147.83931	263.42	Quarterly
BYGW07B	-21.18657	147.83924	263.671	Quarterly
BYGW08	-21.30497	147.84149	290.281	Quarterly
BYGW09	-21.11361	147.81932	359.04	Quarterly
BYGW10	-21.08439	147.90988	245.616	Quarterly
Wetland Bore	-21.27019	147.82330	To be confirmed	Quarterly
Third Party Bores				
RN 25633	-21.07455	147.93971	To be confirmed	Prior to commencement of operational mining activities in close proximity to these bores and then quarterly for 12
RN 25636	-21.05829	147.91888	To be confirmed	
RN 25638	-21.06794	147.88277	To be confirmed	
RN 25686	-21.33111	147.93387	To be	

Monitoring Point	Location		Surface RL (m)[2]	Monitoring Frequency[1]
	Latitude (GDA94 – Zone 54)	Longitude (GDA94 – Zone 54)		
			confirmed	months after operational mining activity commences.
RN 60458	-21.18048	147.86610	To be confirmed	
RN 60459	-21.17601	147.92027	To be confirmed	

NOTE: [1]Monitoring is not required where a bore has been removed as a direct result of the mining activity.

[2]RL must be calculated from the nearest 5cm from the top of the bore casing.

[3]Reference sites must:

(a) have a similar flow regime;

(b) be from the same bio-geographic and climatic region;

(c) have similar geology, soil types and topography; and

(d) not be so close to the test sites that any disturbance at the test site also results in a change at the reference site.

Table E2 - Groundwater quality triggers

Parameter[2]	Contaminant Triggers (µg/L)
Aluminium	TBA[1]
Antimony	TBA[1]
Arsenic	TBA[1]
Iron	TBA[1]
Molybdenum	TBA[1]
Mercury	TBA[1]
Selenium	TBA[1]
Silver	TBA[1]
Total Dissolved Solids	TBA[1]
Electrical Conductivity	TBA[1]
Sulphate	TBA[1]
Calcium	TBA[1]
Magnesium	TBA[1]
Sodium	TBA[1]
Potassium	TBA[1]
Chloride	TBA[1]
Carbonate	TBA[1]
Bicarbonate	TBA[1]
Total Petroleum Hydrocarbons	TBA[1]
pH	TBA[1]

NOTE: [1]Contaminant triggers to be determined based on a background monitoring program of representative groundwater samples from aquifers identified as potentially affected by mining activities, including at least 12 sampling events, (with sampling distribution to ensure sufficient samples are obtained in all seasons, and is submitted to the administering authority in accordance with condition E2. Triggers to be determined on 85th percentile of background.

[2]Trigger levels for metal/metalloids apply if dissolved results exceed triggers.

E4 If quality characteristics of groundwater from groundwater monitoring bores identified in **Table E1 - Groundwater monitoring locations and frequency** reach any of the trigger levels stated in **Table E2 - Groundwater quality triggers**, the holder of this environmental authority must complete an investigation and take action to minimise the potential for environmental harm.

E5 Groundwater standing water level

In the event that groundwater fluctuations in excess of 2 metres per year are detected at the groundwater monitoring locations in **Table E1 - Groundwater monitoring locations and frequency**, an investigation must be undertaken within 14 days of detection to determine if the fluctuations are a result of:

a) mining activities;

b) pumping from licensed bores; or

c) seasonal variation.

E6 In the event that groundwater fluctuations are a result of mining activities the environmental authority holder must meet the notification requirement of condition A11 of this environmental authority.

E7 Bore construction and maintenance and decommissioning

The construction, maintenance and management of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.

E8 Stygofauna sampling

The environmental authority holder must:

a) undertake stygofauna assessments prior to the commencement of dewatering activities and after a preceding wet season in accordance with the Western Australian guidelines 54 and 54a (2003 and 2007) or any subsequent guidelines of best practice

b) implement protection control strategies for any significant species of stygofauna likely to be impacted.

Schedule F – Water

F1 Contaminants that will, or have the potential to cause environmental harm, must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.

F2 Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in **Table F1- Mine affected water release points, sources and receiving waters** and depicted in **Figure 2 - Mine affected water release points, sources and receiving waters** attached to this environmental authority.

NOTE: *Mine affected water: see definitions attached to this environmental authority.*

Table F1 - Mine affected water release points, sources and receiving waters

Release Point (RP)[1]	MGA Zone 55 Easting (GDA94)	MGA Zone 55 Northing (GDA94)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
M1	-21.13863	147.83570	Mine affected water from activities (North Pit)	Spillway	Adjacent drainage line feeding Kangaroo Creek catchment
M2	-21.23719	147.85444	Mine affected water from activities (West Pit 2 and 3)	Spillway	Adjacent drainage line feeding Kangaroo Creek catchment
M3	-21.23630	147.85402	Mine affected water from activities (West Pit 2 and 3)	Spillway	Adjacent drainage line feeding Kangaroo Creek catchment
M4	-21.28327	147.83317	Mine affected water from activities (West Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M5	-21.28515	147.83448	Mine affected water from activities (West Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M6	-21.28411	147.83450	Mine affected water from activities (West Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M7	-21.28123	147.86067	Mine affected water from activities (West Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M8	-21.30424	147.89463	Mine affected water from activities (East Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M11	-21.32468	147.84332	Mine affected water from activities (South Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M12	-21.32267	147.84228	Mine affected water from activities (South Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M13	-21.29202	147.86370	Mine affected water from activities (South Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M14	-21.29206	147.87970	Mine affected water from activities (South Pit 1)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M17	-21.33270	147.84553	Mine affected water from activities (South Pit 2)	Spillway	Adjacent drainage line feeding Upper Suttor catchment
M18	-21.33203	147.86498	Mine affected water from activities	Spillway	Adjacent drainage line feeding Upper Suttor catchment

Release Point (RP)[1]	MGA Zone 55 Easting (GDA94)	MGA Zone 55 Northing (GDA94)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
			(South Pit 2)		
M21	-21.31114	147.91475	Mine affected water from activities (East Pit 2)	Spillway	Adjacent drainage line feeding Upper Suttor catchment

F3 The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F27 is permitted.

F4 The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in **Table F2 - Mine affected water release limits** when measured at the monitoring points specified in **Table F1- Mine affected water release points, sources and receiving waters** for each quality characteristic.

F5 The release of mine affected water to waters from the release points must be monitored at the locations specified in **Table F1- Mine affected water release points, sources and receiving waters** for each quality characteristic and at the frequency specified in **Table F2 Mine affected water release limits** and **Table F3 - Release contaminant trigger investigation levels, potential contaminants**.

NOTE: the administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response in the event condition F5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.

F6 If quality characteristics of the release exceed any of the trigger levels specified in **Table F3 - Release contaminant trigger investigation levels,** potential contaminants during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** and:

a) where the trigger values are not exceeded then no action is to be taken; or

b) where the downstream results exceed the trigger values specified in **Table F3 - Release contaminant trigger investigation levels, potential contaminants** for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites; and

1. if the result is less than the background monitoring site data, then no action is to be taken; or
2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 90 days of receiving the result , outlining

(i) details of the investigations carried out;

(ii) actions taken to prevent environmental harm.

NOTE: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 b) 2 of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

F7 If an exceedance in accordance with condition F6 b)2 is identified, the holder of the environmental authority must notify the administering authority in writing within 24 hours of receiving the result.

F8 Mine affected water release events

The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations specified in **Table F6 - Receiving water upstream background sites and downstream monitoring points** and flow recording frequency specified in **Table F4 - Mine affected water release during flow events.**

F9 Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in **Table F4 - Mine affected water release during flow events** for the release point(s) specified in **Table F1 - Mine affected water release points, sources and receiving waters.**

F10 The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in **Table F4 - Mine affected water release during flow events** when measured at the monitoring points specified in **Table F1 - Mine affected water release points, sources and receiving waters.**

F11 The daily quantity of mine affected water released from each release point must be measured and recorded.

F12 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Table F2 - Mine affected water release limits

Quality Characteristic	Suttor River Release Limits^	Kangaroo Creek^^ Release Limits^	Monitoring frequency[3]	Comment
Electrical conductivity (µS/cm)	Release limits specified in Table F4.	Release limits specified in Table F4.	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
pH (pH unit)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
Total Suspended Solids[1] (mg/L)	122	TBC	At commencement and prior to cessation of release (at a minimum) and weekly during a release	Suspended solids are required to measure the performance of sediment and erosion control measures.
Turbidity[2] (NTU)	283	TBC	At commencement and prior to cessation of release (at a minimum) and weekly during a release	
Sulphate (SO_4^{2-}) (mg/L)	250	250	At commencement and prior to cessation of release (at a minimum) and weekly during a release	Drinking water environmental values from the NHMRC 2006 or ANZECC & ARMCANZ 2000 guidelines.

NOTE: ^The quality characteristics required to be monitored as per Table F2 can be reviewed once the results of 10 flow events or three years of monitoring data is available to adequately demonstrate negligible environmental risk.

^^No release is to occur until sufficient data is provided for Kangaroo Creek WQO's provided as per requirement of ^

*[1]Limit for total suspended solids to be determined based on three years of background monitoring of representative surface water samples for the Suttor River and Kangaroo Creek release upstream monitoring locations identified in **Table F6 - Receiving water upstream background sites and downstream monitoring points**. Limits are to be determined on 85th percentile of background data results.*

[2]Limit for total suspended solids can be omitted if turbidity limit is included for the duration of a background data investigation[1] for total suspended solids. Limit for turbidity not required if suspended solids limit included. Both indicators should be measured in all cases.

[3]The determination of suitability for release of water should be informed by monitoring undertaken prior to release.

Table F3 - Release contaminant trigger investigation levels, potential contaminants

Quality Characteristic	Suttor River – Sub catchment *Trigger Levels (µg/L)*	Rosella Creek – Sub Catchment Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	55	*For aquatic ecosystem protection, based on LOR for ICPMS*	Commencement of release and thereafter weekly during release
Arsenic	13	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	10	10	*For aquatic ecosystem protection, based on SMD guideline*	
Mercury	0.2	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	8	*For aquatic ecosystem protection, based on SMD guideline*	
Boron	370	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	1.4	1.4	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Selenium	10	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Silver	1	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Uranium	1	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Vanadium	10	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Ammonia	900	900	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2009)*	
Nitrate	1000	1000	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2009)*	

Quality Characteristic	Suttor River – Sub catchment *Trigger Levels (µg/L)*	Rosella Creek – Sub Catchment Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Petroleum hydrocarbons (C6-C9)	20	20		
Petroleum hydrocarbons (C10-C36)	100	100		
Fluoride (total)	2000	2000	*Protection of livestock and short term irrigation guideline*	
Sodium	**TBC**	**TBC**		
Suspended Solids	122 000	**TBC**		
Sulphate	250 000	250 000		

NOTE:

1. *All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.*
2. *The quality characteristics required to be monitored as per Table F3 can be reviewed once the results of 10 flow events or 3 years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table F3 by amendment.*
3. *SMD – slightly moderately disturbed level of protection; guideline refers ANZECC & ARMCANZ (2000).*
4. *LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.*

Table F4 –Mine affected water release during flow events

Receiving Waters / Stream - Kangaroo Creek[1]			
Receiving Water Flow Criteria (m^3/s)	**Electrical Conductivity Release Limit (µS/cm)**	**Maximum Combined Release Rate (m^3/s)**	**Monitoring Frequency**
Low[2] >0.2	1,252	0.2	Daily (during the release of mine water): Monthly (of natural flow).
Medium 0.2 – 0.5	1,600	0.1	
High 0.5 – 2.0	2,100	0.1	
	1,550	0.3	
Very High 2.0 – 7.5	3,000	0.2	
	1,600	1.0	
Flood >7.5	4,000	0.5	
	2,000	2.0	
Receiving Waters / Stream – Suttor River[1]			
Receiving Water Flow Criteria (m^3/s)	**Electrical Conductivity Release Limit (µS/cm)**	**Maximum Combined Release Rate (m^3/s)**	**Monitoring Frequency**
Low[2] >0.5	228	0.5	Daily (during the release of mine water): Monthly (of natural flow)
Medium 1.0 – 5.0	460	0.5	
	1,200	0.1	
High 5.0 – 15.0	1,300	0.2	
	3,000	0.1	
Very High 15.0 – 50	1,600	0.5	
	4,500	0.1	
Flood >50 m^3/s	2,000	1.3	
	6,500	0.4	

NOTE: [1]The characteristics required to be monitored as per Table F4 can be reviewed once the results of 10 flow events, or 3 years monitoring data is available; or if sufficient data is available to adequately demonstrate negligible environmental risk.

[2] For a period of 28 days after natural flow events that exceed the receiving water flow criteria.

F13 Notification of release event

The environmental authority holder must notify the administering authority as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment. Notification must include the

submission of written advice to the administering authority of the following information:

a) release commencement date/time;

b) details regarding the compliance of the release with the conditions of **Schedule F - Water** of this environmental authority (that is, contaminant limits, natural flow, discharge volume);

c) release point/s;

d) release rate;

e) release salinity;

f) receiving water/s including the natural flow rate.

NOTE: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email or facsimile.

F14 The environmental authority holder must notify the administering authority as soon as practicable and nominally no later than 24 hours after cessation of a release event of the cessation of a release notified under condition F13 and within 28 days provide the following information in writing:

a) release cessation date/time;

b) natural flow rate in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of **Schedule F – Water** of this environmental authority (i.e. contaminant limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results;

f) any other matters pertinent to the water release event.

NOTE: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F13 and F14, provided the relevant details of the release are included within the notification provided in accordance with conditions F13 and F14.

F15 Notification of release event exceedance

If the release limits defined in **Table F2 - Mine affected water release limits** are exceeded, the holder of the environmental authority must notify the administering authority within 24 hours of receiving the results.

F16 The environmental authority holder must, within 28 days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) the total volume of the release and which (if any) part of this volume was non-compliant;

d) the total duration of the release and which (if any) part of this period was non-compliant;

e) all water quality monitoring results (including all laboratory analyses);

f) identification of any environmental harm as a result of the non compliance;

g) all calculations;

h) any other matters pertinent to the water release event.

F17 Receiving environment monitoring and contaminant trigger levels

The quality of the receiving waters must be monitored at the locations specified in **Table F6 - Receiving water upstream background sites and downstream monitoring points** and **Figure 2 Mine affected water release points, sources and receiving waters** for each quality characteristic and at the monitoring frequency stated in **Table F5 - Receiving waters contaminant trigger levels**.

F18 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in **Table F5 - Receiving waters contaminant trigger levels** during a release event, the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:

a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or

b) where the downstream results exceed the upstream results, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

1. details of the investigations carried out;
2. actions taken to prevent environmental harm.

NOTE: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F18 b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

Table F5 - Receiving waters contaminant trigger levels

Quality Characteristic[1]	Trigger Level – Suttor River	Trigger Level – Kangaroo Creek	Monitoring Frequency
pH	6.5 – 9.0	6.5 – 9.0	Daily during the release
Electrical Conductivity (µS/cm)	228	1252	
Suspended solids (mg/L)	122	TBC	
Sulphate (SO_4^{2-}) (mg/L)	250	250	

NOTE: [1]The receiving waters trigger level quality characteristic required to be monitored as per Table F5 can be reviewed once the results of 10 flow events, or, 3 years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk.

Table F6 - Receiving water upstream background sites and downstream monitoring points

Monitoring Points	Receiving Waters Location Description	Latitude (Easting GDA94)	Longitude (Northing GDA94)
Upstream Background Monitoring Points			
Monitoring Point MP1	Suttor River Flow gauging station upstream of mine releases at the edge of ML.	-21.28923	147.81965
Monitoring Point MP2	Kangaroo Creek upstream of North Pit contribution	-21.16343	147.84955
Downstream Monitoring Points			
Monitoring Point CP1	Suttor River downstream of mine releases at edge of ML	-21.31725	147.81772
Monitoring Point CP2	Kangaroo Creek downstream of upstream of North Pit contribution at edge of ML	-21.15280	147.86781

NOTE: The data from background monitoring points must not be used where they are affected by releases from other mines.

F19 All determinations of water quality and biological monitoring must be performed by an appropriately qualified person.

F20 Receiving Environment Monitoring Program (REMP)

The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

For the purposes of the REMP, the receiving environment is the waters of the Suttor River and Kangaroo Creek and connected or surrounding waterways within ***16km*** downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

F21 The REMP must be designed to ensure that the ecosystem functionality of the western boundary palustrine wetland can be demonstrated to have returned to close to (or better) than pre development condition.

F22 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions F20 and F21 must be prepared annually and made available on request to the administrating authority. This must include an assessment of background reference water quality, the

condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

F23 A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administrating authority upon request.

F24 Water re-use

Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party (with the consent of the third party).

F25 Annual water monitoring reporting

The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format:

a) the date on which the sample was taken;

b) the time at which the sample was taken;

c) the monitoring point at which the sample was taken;

d) the measured or estimated daily quantity of mine affected water released from all release points;

e) the release flow rate at the time of sampling for each release point;

f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority;

g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

F26 Water management plan

A Water management plan must be developed by an appropriately qualified person and implemented.

F27 Stormwater and water sediment controls

An erosion and sediment control plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

F28 Stormwater, other than mine affected water, is permitted to be released to waters from:

a) erosion and sediment control structures that are installed and operated in accordance with the erosion and sediment control plan required by condition F27;

b) water management infrastructure that is installed and operated, in accordance with a water management plan that complies with condition F26, for the purpose of ensuring water does not become mine affected water.

Schedule G – Sewage Treatment

G1 The only contaminant permitted to be released to land is treated sewage effluent in compliance with the release limits stated in **Table G1 - Contaminant release limits to land**.

Table G1 - Contaminant release limits to land

Contaminant	Unit	Release Limit	Limit Type	Monitoring Frequency
5 day Biochemical oxygen demand (BOD)1	mg/L	20	Maximum	Monthly
Total suspended solids	mg/L	30	Maximum	Monthly
Nitrogen	mg/L	30	Maximum	Monthly
Phosphorus	mg/L	15	Maximum	Monthly
E-coli	Organisms/100 ml	1000	Maximum	Monthly
pH	pH units	6.0 – 9.0	Range	Monthly

G2 Treated sewage effluent may only be released to land in accordance with the conditions of this approval at the following locations:

a) within the nominated area(s) identified in Figure 2 (irrigation areas);

b) other land for the purpose of dust suppression and/or fire fighting.

G3 The application of treated effluent to land must be carried out in a manner such that:

a) vegetation is not damaged;

b) there is no surface ponding of effluent;

c) there is no run-off of effluent.

G4 If areas irrigated with effluent are accessible to employees or the general public, prominent signage must be provided advising that effluent is present and care should be taken to avoid consuming or otherwise coming into unprotected contact with the effluent.

G5 All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in **Table G1 - Contaminant release limits to land**.

G6 The daily volume of effluent release to land must be measured and records kept of the volumes of effluent released.

G7 When circumstances prevent the irrigation or beneficial re-use of treated sewage effluent such as during or following rain events, waters must be directed to a wet weather storage or alternative measures must be taken to store/lawfully dispose of effluent.

G8 Water or stormwater contaminated by sewage treatment activities must not be released to any waters or the bed and banks of any waters.

G9 A minimum area of 1ha of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial re-use of treated sewage effluent.

G10 Treated sewage effluent must only be supplied to another person or organisation that has a written plan detailing how the user of the treated sewage effluent will comply with their general environmental duty under section 319 of the Act whilst using the treated sewage effluent.

Explanatory note — the supply of treated wastewater for re-use is regulated under the *Water Supply (Safety and Reliability) Act 2008.*

Schedule H – Land and rehabilitation

H1 Rehabilitation

Land disturbed by mining must be rehabilitated in accordance with Table BY1 attached to this environmental authority.

H2 The rehabilitation completion criteria outlined in Table BY1 must be reviewed by <insert date 5 years after the issue date for this environmental authority>, and from then on every 5 years with a copy submitted for approval by the administering authority.

NOTE: The date set in this condition may not be changed or extended.

H3 Rehabilitation must commence progressively in accordance with the plan of operations.

H4 A copy of rehabilitation monitoring must be made available to the administering authority upon request.

H5 Topsoil management plan

A topsoil management plan must be developed by an appropriately qualified person and implemented.

H6 Mining waste management

A waste rock and spoil disposal plan must be developed and include, where relevant, at least:

a) effective characterisation of the waste rock and spoil to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances;

b) a program of progressive sampling and characterisation to identify dispersive and non-dispersive spoil and the salinity, acid and alkali producing potential and metal concentrations of waste rock;

c) a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage;

d) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming and acid-forming waste rock;

e) how often the performance of the plan will be assessed;

f) the indicators or other criteria on which the performance of the plan will be assessed;

g) rehabilitation strategy.

Monitoring or rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of the placed materials, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.

H7 Areas that are, or are proposed, to contain tailings within waste rock, spoil, overburden or interburden emplacement areas must be identified in the current Plan of Operations.

H8 Self-sustaining vegetation and native ecosystem, as per Table BY1, must be consistent with the reference sites identified in Table H1 (yet to be provided by the environmental authority holder*).

Table H1 - Reference sites

Reference Site	Domain Reference	Latitude (GDA94)	Longitude (GDA94)	Description
TBA*	TBA*	TBA*	TBA*	TBA*
TBA*	TBA*	TBA*	TBA*	TBA*
TBA*	TBA*	TBA*	TBA*	TBA*

*Reference sites must be determined within 12 months from the take effect date of this authority.

H9 Contaminated land

Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.

H10 Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition H1.

H11 Minimise the potential for contamination of land by hazardous contaminants.

H12 Chemicals and flammable or combustible liquids

All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental

harm and maintained in accordance with the current edition of *AS 1940 – Storage and Handling of Flammable and Combustible Liquids*.

H13 All chemicals and flammable or combustible liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian standard exists store such materials within an effective on-site containment system, the environmental authority holder must:

a) Minimise the potential for contamination of land and waters by diverting stormwater around contaminated areas and facilities used for the storage of chemicals and flammable or combustible liquids.

H14 Residual void outcome

Residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority.

H15 All reasonable and practical measures must be taken to minimise the size of the void remaining after mining activities cease.

H16 Biodiversity offsets

The holder of this environmental authority must provide an offset for impacts on applicable state significant biodiversity values, in accordance with the Queensland Biodiversity Offset Policy. The biodiversity offset must be consistent with the requirements for an offset as identified in the Biodiversity Offset Strategy (as per condition H17) and must be provided:

a) prior to impacting on state significant biodiversity values; or

b) where a land based offset is to be provided, within 12 months of the later of either of the following;

    1. the date of issue of this environmental authority; or
    2. the relevant stage identified in the Biodiversity Offset Strategy submitted under condition H17; or

c) where an offset payment is to be provided, within 4 months of the later of either of the following

    1. the date of issue of this environmental authority; or
    2. the relevant stage identified in the Biodiversity Offset Strategy submitted under conditions H17.

H17 A Biodiversity Offset Strategy must be developed and submitted to the administering authority within either 30 days, or a lesser period agreed to by the administering authority, prior to impacting on the applicable state significant biodiversity values.

Schedule J – Dams and levees

J1 Consequence category

The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* at the following times:

a) prior to the design and construction of the structure; and

b) prior to any change in its purpose or the nature of its stored contents.

J2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

J3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

J4 Design and construction of a regulated structure

All regulated structures must be designed by, and constructed under the supervision of a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

J5 Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority, certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.

J6 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*, and must be recorded in the Regulated Dams/Levees register.

J7 **Regulated structures** must:

a) be designed and constructed in accordance with and conform to the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*;

b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

   i. floodwaters entering the regulated dam from any watercourse or drainage line; and

   ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line;

c) for dams associated with a failure to contain; have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of

the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.

J8 Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:

a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure;

b) construction of the regulated structure is in accordance with the design plan.

J9 Operation of a regulated structure

Operation of a regulated structure is prohibited unless:

a) the holder has submitted to the administering authority:

i. one paper copy and one electronic copy of the design plan and certification of the ‘design plan’ in accordance with conditions J4 to J6;

ii. a set of ‘as constructed’ drawings and specifications;

iii. certification of those ‘as constructed drawings and specifications’ in accordance with condition J8;

iv. where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the Design Storage Allowance (DSA) volume across the system, a copy of the certified system design plan;

v. the requirements of this authority relating to the construction of the regulated structure have been met;

vi. the holder has entered the details required under this authority, into a Register of Regulated Dams;

vii. there is a current operational plan for the regulated structures.

J10 Each regulated structure must be maintained and operated for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified ‘as constructed’ drawings.

J11 Mandatory reporting level

Conditions J11 to J15 inclusive only apply to Regulated Structures which have not been certified as low consequence category for ‘failure to contain – overtopping’.

J12 The mandatory reporting level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.

J13 The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

J14 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

J15 The holder must record any changes to the MRL in the Register of Regulated Structures.

J16 Design storage allowance

The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

J17 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the DSA volume for the dam (or network of linked containment systems).

J18 The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

J19 The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

J20 Annual inspection

Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

J21 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure. Regulated structures must be assessed:

a) against the most recent hazard assessment report and design plan (or system design plan);

b) against recommendations contained in previous annual inspections reports;

c) against recognised dam safety deficiency indicators;

d) for changes in circumstances potentially leading to a change in hazard category;

e) for conformance with the conditions of this authority;

f) for conformance with the ‘as constructed’ drawings;

g) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment

barrier and the level of liquids in the dam (or network of linked containment systems);

h) for evidence of conformance with the current operational plan.

J22 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

J23 The environmental authority holder must:

a) within 20 business days of receipt of the annual inspection report, provide to the administering authority:

i. The recommendations section of the annual inspection report; and

ii. If applicable, any actions being taken in response to those recommendations; and

b) if, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.

J24 Transfer arrangements

The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

J25 Decommissioning and rehabilitation

Dams must not be abandoned but must be either:

a) decommissioned and rehabilitated to achieve compliance with condition (J26); or

b) be left in-situ for a beneficial use(s) provided that:

i. it no longer contains contaminants that will migrate into the environment; and

ii. it contains water of a quality that is demonstrated to be suitable for its intended beneficial use(s); and

iii. the administering authority, the holder of the environmental authority and the landholder agree in writing that the dam will be used by the landholder following the cessation of the environmentally relevant activity(ies).

J26 After decommissioning, all significantly disturbed land caused by the carrying out of the environmentally relevant activity(ies) must be rehabilitated to meet the following final acceptance criteria:

a) the landform is safe for humans and fauna;

b) the landform is stable with no subsidence or erosion gullies for at least three (3) years;

c) any contaminated land (e.g. contaminated soils) is remediated and rehabilitated;

d) not allowing for acid mine drainage;
e) there is no contamination to waters (including groundwater);
f) rehabilitation is undertaken in a manner such that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the Instructions for the treatment and management of acid sulfate soils (2001);
g) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
h) for land that is not being cultivated by the landholder:
    i. groundcover that is not a declared pest species is established and self-sustaining;
    ii. vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining;
    iii. the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the mining activity(ies);
    iv. for land that is to be cultivated by the landholder, cover crop is revegetated, unless the landholder will be preparing the site for cropping within 3 months of mining activities being completed.

J27 Register of Regulated Dams

A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.

J28 The holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.

J29 The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition J9 has been achieved.

J30 The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.

J31 All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

J32 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Figures

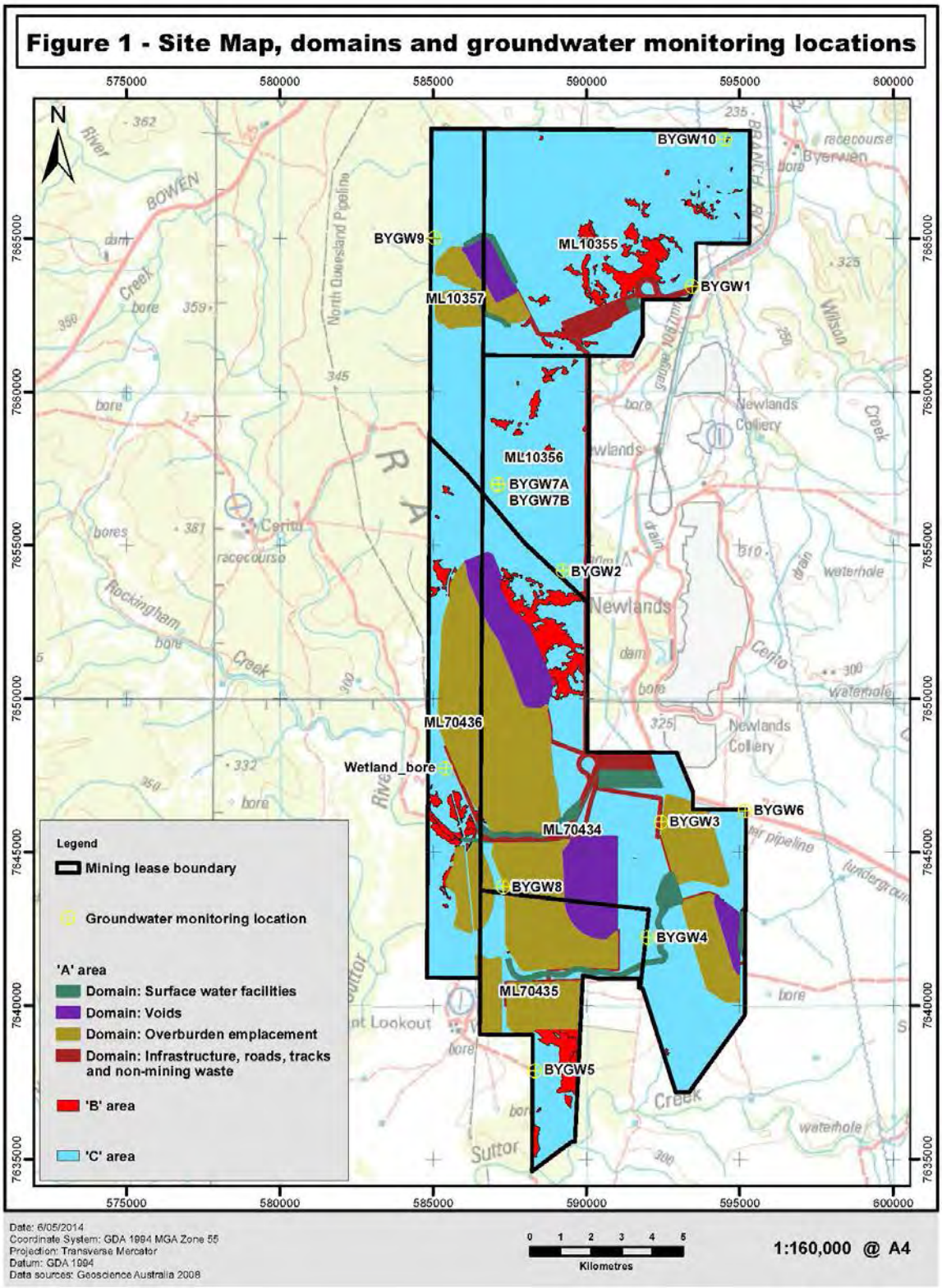


Figure 1 – Site map, domains and groundwater monitoring locations

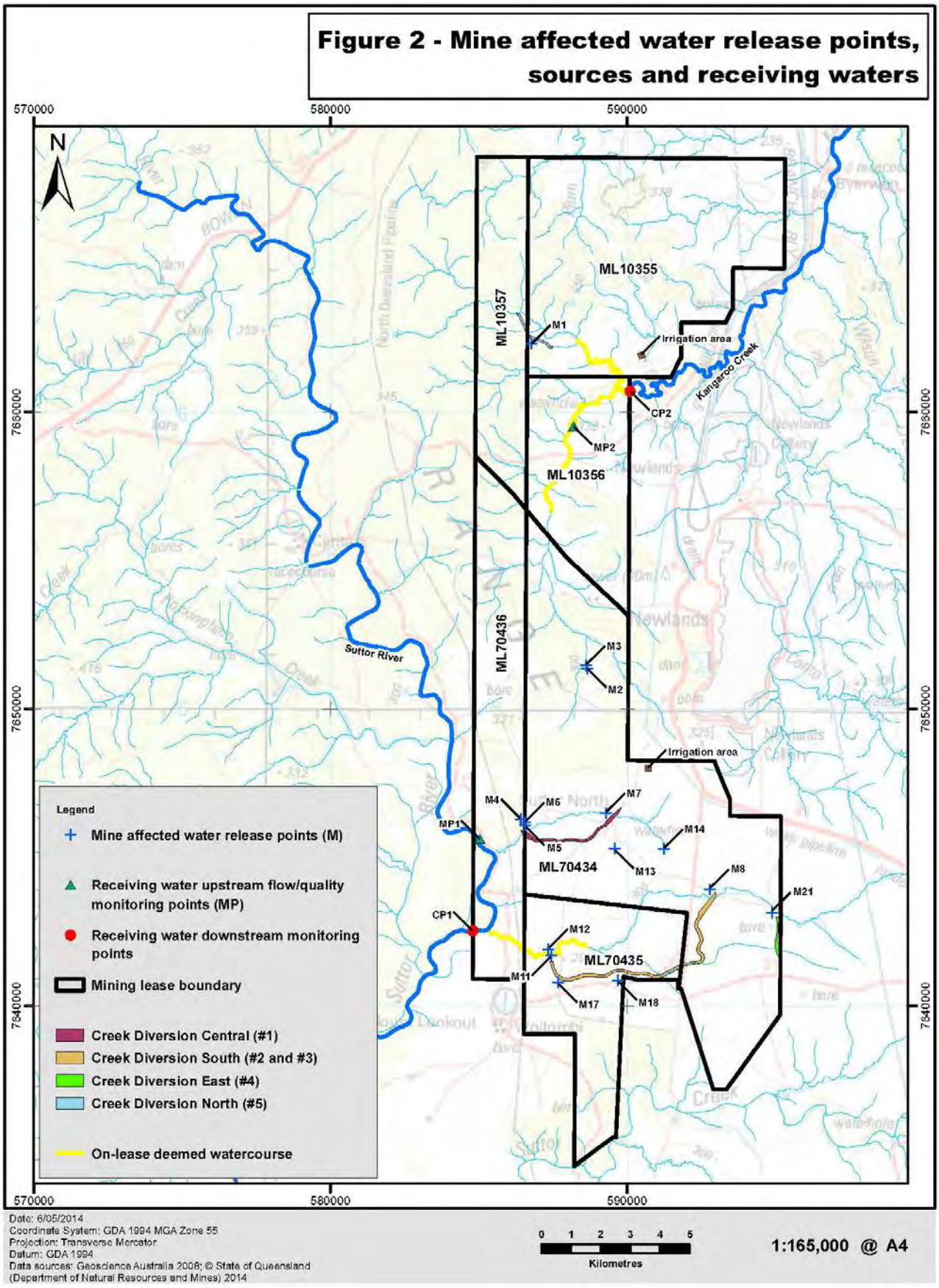


Figure 2 – Mine affected water release points, sources and receiving waters

Definitions

Words and phrases used throughout this environmental authority are defined below. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the EP Act 1994 or subordinate legislation, the definition in the EP Act or subordinate legislation must be used.

'acid mine drainage' means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.

'airblast overpressure' means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

'background', with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

'certification', **'certifying'** or **'certified'** by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

a) exactly what is being certified and the precise nature of that certification;

b) the relevant legislative, regulatory and technical criteria on which the certification has been based;

c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

'blasting' means the use of explosive materials to fracture:

a) rock, coal and other minerals for later recovery; or

b) structural components or other items to facilitate removal from a site or for re-use.

'chemical' means:

a) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth); or

b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or

c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;

d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth; or

e) any substance used as, or intended for use as:

(i) a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or

(ii) a surface active agent, including, for example, soap or related detergent; or

(iii) a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or

(iv) a fertiliser for agricultural, horticultural or garden use; or

(v) a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or

(vi) manufacture of plastic or synthetic rubber.

'commercial place' means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.

'construction' or **'constructed'** in relation to a regulated structure includes building a new regulated structure and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

'disturbance' of land includes:

a) compacting, removing, covering, exposing or stockpiling of earth;

b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion;

c) carrying out mining within a watercourse, waterway, wetland or lake;

d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls;

e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or

f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of 'disturbance':

a) areas off lease (e.g. roads or tracks which provide access to the mining lease);

b) areas previously disturbed which have achieved the rehabilitation outcomes;

c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);

d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner.

e) disturbance that pre-existed the grant of the tenure.

'effluent' treated waste water released from sewage treatment plants.

'hazard category' means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams'.

'infrastructure' means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.

'land' in 'Schedule H – Land and rehabilitation' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the *Environmental Protection Act 1994*. For the purposes of the *Acts Interpretation Act 1954*, it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

'land use' –means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

'leachate' means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

'm' means metres.

'mine affected water':

a) means the following types of water:

i) pit water, tailings dam water, processing plant water;

ii) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity;

iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an erosion and sediment control plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;

iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;

v) groundwater from the mine's dewatering activities;

vi) a mix of mine affected water (under any of paragraphs i)-v) and other water.

b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:

(i) land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or

ii) land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:

a. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;

b. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water

release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or

iii) both.

'Mining waste' means waste rock, spoil, overburden and interburden.

'measures' includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

'natural flow' means the flow of water through waters caused by nature.

'non-polluting' means having no adverse impacts upon the receiving environment.

'peak particle velocity (ppv)' means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s).

'protected area' means – a protected area under the *Nature Conservation Act 1992*; or

a) a marine park under the *Marine Parks Act 1992*; or

b) a World Heritage Area.

'receiving environment' in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

a) a watercourse;

b) groundwater; and

'receiving waters' means the waters into which this environmental authority authorises releases of mine affected water.

'rehabilitation' the process of reshaping and revegetating land to restore it to a stable landform

'release event' means a surface water discharge from mine affected water storages or contaminated areas on the licensed place meaning the mining activities carried out at the mining tenements detailed in **Figure 1 – Site map, domains and groundwater monitoring locations** of this environmental authority.

'RL' means reduced level, relative to mean sea level as distinct from depths to water.

'representative' means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

'sensitive place' means:

a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or

b) a motel, hotel or hostel; or

c) an educational institution; or

d) a medical centre or hospital; or

e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or

f) a public park or gardens.

Note: The definition of ‘sensitive place’ and ‘commercial place’ is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under *Nature Conservation Act 1992* as a critical habitat or an area of major interest, marine park under *Marine Parks Act 2004*, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

‘the Act’ means the *Environmental Protection Act 1994*.

‘µS/cm’ means micro siemens per centimetre.

‘watercourse’ has the same meaning given in the *Water Act 2000*.

‘water quality’ means the chemical, physical and biological condition of water.

‘waters’ includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), storm water channel, storm water drain, and groundwater and any part thereof.

Table BY1: Rehabilitation completion criteria

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
Overburden emplacement	• Waste rock dumps • Topsoil stockpiles	Long-term safety	Structurally safe for humans and animals with no hazardous materials	Designed and built by suitably qualified person (SQP) for structural soundness.	Areas assessed by SQP as meeting a maximum slope of 11.5^{o}.
				Contaminated land assessment.	Evidence provided by SQP in contaminated land assessment report that: - land is not contaminated land; or - where land is identified as contaminated land, action has been taken to remediate the land to prevent serious environmental harm to a person, animal or another part of the environment; or - where land is identified as contaminated land, it can be used for stated uses with further management.
				Presence of heavy metals and toxic materials.	Certification by a SQP that the presence is at a negligible, or acceptable, level and there is a low risk of future contamination.
				Fauna species on-site or widespread vegetation cover that provides habitat.	Evidence of native fauna using the area and/or vegetation is self-sustaining with minimal to nil weed presence.
		Non-polluting	Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials.	Certification by a SQP that the presence is at a negligible, or acceptable, level and there is a low risk of future exposure and availability of hazardous materials.
				Contaminated land assessment.	Contaminated land is managed appropriately in accordance with the relevant administering authority guideline/s. A suitably qualified and experienced person has certified that contamination will not occur.
				Rejects layers are managed to avoid exposure.	Rejects layers are capped with at least 1.5 m of waste rock material.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
			Polluted water contained on-site	Downstream and upstream surface and groundwater monitoring.	Monitoring results indicate site-caused pollution has not occurred.
			Rehabilitation of drill pads	All monitoring bores described in the environmental authority have been rehabilitated.	Vegetation cover across drill pads is similar to the surrounding environment.
			Diversion design and maintenance achieves a stable channel and appropriate erosion rates	Stream bank stability.	Stream banks no longer require ongoing management.
				Surface water monitoring indicates similar water quality between the upstream and downstream monitoring points.	Monitoring results indicate site-caused pollution has not occurred.
		Stable landform	Very low probability of slope slippage or failure with serious environmental consequences	Past record of slope failure.	Nil records of slope failure; if slope failure has occurred it is rectified and ongoing design accounts for the previous failure.
			Design resembles naturally occurring landforms	Slope angle and length.	Designed as appropriate by a SQP. Constructed slope and length meet specifications.
				Maximum slope ranges are as follows: Waste Rock Dumps = 11.5°	Slope requirements are met.
				Engineered structures to control water flow.	Water flows occur as designed.
				Rates of “soil” loss.	Soil loss and erosion rates are minimal and similar to naturally occurring rates as assessed by a SQP or reflected in downstream monitoring points.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				Dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in the corresponding reference sites.	Erosion rills and gullies are similar in characteristics to reference sites.
			Vegetation cover to minimise erosion	Vegetation type and density.	Certification that the vegetation type and density suit the underlying soil characteristics and are similar in composition and density to the reference site.
				Foliage protective cover (FPC).	FPC achieved throughout the year.
				Leaf litter, humus, depth of growing medium.	Growing medium depth allows suitable vegetation to grow.
			Very low probability of rock falls with serious environmental consequences	Geotechnical studies.	Designed as low probability by SQP.
				Past record of rock falls.	Past record (previous 5 years) shows nil rock falls or when they have occurred that appropriate actions have occurred to rectify the issue and prevent further occurrences.
			The diversions and run off drainage lines mirror natural stream functions	Designed and constructed in accordance with the relevant Queensland Government guideline/s.	Designed by a SQP.
				Stream bank erosion rates	Diversion designed by a SQP to achieve minimal erosion rates.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
		Sustainable land use	Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrients, trace elements) of topsoil and in soil profiles support the proposed vegetation.	Certification by a SQP that the topsoil chemical properties do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <1.2 dS/m. • Soil pH is between 5.5 and 10. • Soil Exchange Sodium Percentage (ESP) is <20 per cent. Adequate macro and micro-nutrients are present. Certification by a SQP that the subsoil chemical properties to a depth of 1m do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <3.7 dS/m. • Soil pH is between 3.3 and 9.5. • Soil Exchange Sodium Percentage (ESP) is <42 per cent.
				Physical properties (e.g. depth of top soil, plant available water capacity (PAWC)).	Certification by a SQP that the soil physical properties (e.g. rockiness, depth of soil (including topsoil), wetness, plant available water capacity (PAWC), surface condition) are such that conditions are adequate for plant growth. For example, suitability for beef cattle grazing land use in accordance with Department of Minerals and Energy (DME) 1995 *Land Suitability Assessment Techniques in Technical Guidelines for the Environmental Management of Exploration and Mining.*

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				The following indicators are comparable with reference sites: Organic matter; Soil nutrients; Invertebrate activity; Topsoil depth; Growth media depth; Physical and chemical property limits; Folia nitrogen and phosphorus.	Monitoring results show the indicators are comparable with the reference site.
				Ongoing monitoring to establish positive trends for the rehabilitation of the site compared with reference landscapes, including: Soil stability; Infiltration capacity; Nutrient cycling; Nutrient capacity; Species recruitment; Habitat complexity; Vegetation dynamics; and Seasonal change.	Monitoring results indicate positive trends for the rehabilitation in comparison with the reference site.
				Weed species presence.	Rehabilitated areas comprise native vegetation. Any weed infestations are controlled and managed to achieve control or eradication of weed species.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
Infrastructure, roads, tracks and non-mining waste	• MIA • ROM pad • CHPP • Haul roads and tracks • Services (power, water, telecomm-unications) • Non-mining waste	Long-term safety	Structurally safe for persons and animals in the foreseeable future with no hazardous materials	Assessed and approved by a SQP for structural soundness.	Areas designed by SQP as being structurally sound.
				Contaminated land assessment.	Evidence provided by SQP in contaminated land assessment report that: - land is not contaminated land; or - where land is identified as contaminated land, action has been taken to remediate the land to prevent serious environmental harm to a person, animal or another part of the environment; or - where land is identified as contaminated land, it can be used for stated uses with further management.
				Presence of heavy metals and toxic materials.	Action taken to prevent contamination.
				Fauna species on-site.	Evidence of native fauna using the area.
				Infrastructure including concrete slabs and hard stands decommissioned appropriately.	Certification by an appropriately qualified person that infrastructure has been decommissioned and removed. This may include the retention of infrastructure under an agreement with the land owner.
				Roads, tracks and associated drainage works do not impede fauna use, natural drainage and access across the site, and are removed if requested by the property owner.	Certification by an appropriately qualified person that the infrastructure is not an impediment to fauna.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				Exploration boreholes are decommissioned in accordance with the administering authority's relevant guideline/standard	Certification by an appropriately qualified person that exploration boreholes have been decommissioned and rehabilitated. Reference to the *Minimum Construction Requirements for Water Bores in Australia* (Australian Government February 2012) standards for rehabilitation are made.
		Non-polluting	Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials.	Action taken to prevent ongoing exposure.
				Contaminated land assessment.	Contaminated land is managed appropriately in accordance with the relevant administering authority guideline/s. A suitably qualified and experienced person has certified that contamination will not occur.
			Polluted water contained on-site	Downstream and upstream surface and groundwater monitoring.	Monitoring results indicate site-caused pollution has not occurred.
			Diversion design and maintenance achieves appropriate erosion rates	Stream bank stability.	Stream banks no longer require ongoing management.
				Surface water monitoring required under the environmental authority indicates similar water quality between the upstream and downstream monitoring points.	Monitoring results indicate site-caused pollution has not occurred.
			General, industrial and regulated wastes managed	Waste register records all details of waste handling	Certification by an appropriately qualified person that wastes have been handled, placed or removed and disposed of in accordance with Queensland legislative requirements.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
		Stable landform	Very low probability of slope slippage or failure with serious environmental consequences	Past record of slope failure.	Nil records of slope failure; if slope failure has occurred it is rectified and ongoing design accounts for the previous failure.
			Landform design achieves appropriate erosion rates	Slope angle and length.	Designed as appropriate by a SQP.
				Maximum slope ranges are as follows: Infrastructure & ROM areas = 10° Roads and tracks = 5.7°	Slope requirements are met.
				Engineered structures to control water flow.	Water flows occur as designed.
				Rates of “soil” loss.	Soil loss is minimal as assessed by a SQP or reflected in downstream monitoring points.
				Dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in the corresponding reference sites.	Erosion rills and gullies are similar in characteristics to reference sites.
			Vegetation cover to minimise erosion	Vegetation type and density.	Certification that the vegetation type and density suit the underlying soil characteristics and are similar in composition and density to the reference site.
				Foliage protective cover.	Healthy and abundant.
				Leaf litter, humus, depth of growing medium.	Growing medium depth allows suitable vegetation to grow.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
		Sustainable land use	Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrients, trace elements) of topsoil and in soil profiles support the proposed land use.	Certification by a SQP that the topsoil chemical properties do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <1.2 dS/m. • Soil pH is between 5.5 and 10. • Soil Exchange Sodium Percentage (ESP) is <20 per cent. Adequate macro and micro-nutrients are present. Certification by a SQP that the subsoil chemical properties to a depth of 1m do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <3.7 dS/m. • Soil pH is between 3.3 and 9.5. • Soil Exchange Sodium Percentage (ESP) is <42 per cent.
				Physical properties (e.g. depth of top soil, plant available water capacity (PAWC)).	Certification by a SQP that the soil physical properties (e.g. rockiness, depth of soil (including topsoil), wetness, plant available water capacity (PAWC), surface condition) are such that conditions are adequate for plant growth. For example, suitability for beef cattle grazing land use in accordance with Department of Minerals and Energy (DME) 1995 *Land Suitability Assessment Techniques in Technical Guidelines for the Environmental Management of Exploration and Mining*.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				The following indicators are comparable with reference sites: Organic matter; Soil nutrients; Invertebrate activity; Topsoil depth; Growth media depth; Physical and chemical property limits; Folia nitrogen and phosphorus.	Monitoring results show the indicators are comparable with the reference site.
				Ongoing monitoring to establish positive trends for the rehabilitation of the site compared with reference landscapes, including: Soil stability; Infiltration capacity; Nutrient cycling; Nutrient capacity; Species recruitment; Habitat complexity; Vegetation dynamics; and Seasonal change.	Monitoring results indicate positive trends for the rehabilitation in comparison with the reference site.
				Weed species presence	Rehabilitated areas comprise native vegetation and weed infestations, if any, are controlled and management actions are in place to eradicate weed species.
Voids	• Residual voids	Long-term safety	Structurally safe for persons and animals with no	Assessed and approved by a SQP for structural soundness.	Areas certified by SQP as being structurally sound long-term.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
			hazardous materials	Contaminated land assessment.	Evidence provided by SQP in contaminated land assessment report that: - land is not contaminated land; or - where land is identified as contaminated land, action has been taken to remediate the land to prevent serious environmental harm to a person, animal or another part of the environment; or - where land is identified as contaminated land, it can be used for stated uses with further management.
				Presence of heavy metals and toxic materials.	Action taken to prevent contamination.
				Fauna species on-site.	Evidence of native fauna using the area.
				Fauna access controlled.	Fencing or other suitable barrier installed around the perimeter of the final void to restrict access, if required following safety assessment.
			Flood Protection	Protection system to prevent inundation from a 1:1000 AEP event	Certified by a SQP
		Non-polluting	Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials.	Action taken to prevent ongoing exposure.
				Contaminated land assessment.	Contaminated land is managed appropriately in accordance with the relevant administering authority guideline/s. A suitably qualified and experienced person has certified that contamination will not occur.
			Polluted water contained on-site	Downstream and upstream surface and groundwater monitoring.	Monitoring results indicate site-caused pollution has not occurred.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
			Diversion design and maintenance achieves appropriate erosion rates	Stream bank stability.	Stream banks no longer require ongoing management.
				Surface water monitoring required under the environmental authority indicates similar water quality between the upstream and downstream monitoring points.	Monitoring results indicate site-caused pollution has not occurred.
		Stable landform	Very low probability of slope slippage or failure with serious environmental consequences	Past record of slope failure.	Nil records of slope failure for the previous 5 years; if slope failure has occurred it is rectified and ongoing design accounts for the previous failure.
			Landform design achieves appropriate erosion rates	Slope angle and length.	Designed as appropriate by a SQP.
				Maximum slope ranges are as follows: Residual Voids (high wall) = 65° Residual Voids (low wall) = 45°	Slope requirements are met.
				Engineered structures to control water flow.	Water flows occur as designed.
				Rates of “soil” loss.	Soil loss is minimal as assessed by a SQP or reflected in downstream monitoring points.
				Dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in the corresponding reference sites.	Erosion rills and gullies are similar in characteristics to reference sites.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
			Vegetation cover to minimise erosion	Vegetation type and density.	Certification by a SQP that the vegetation type and density suit the underlying soil characteristics and are similar in composition and density to the reference site.
				Foliage protective cover.	Healthy and abundant.
				Leaf litter, humus, depth of growing medium.	Growing medium depth allows suitable vegetation to grow.
			Very low probability of rock falls with serious environmental consequences	Geotechnical studies.	Designed as low probability by SQP.
				Past record of rock falls.	Past record shows nil rock falls or when they have occurred that appropriate actions have occurred to rectify the issue.
			The diversions and run off drainage lines mirror natural stream functions	Designed and constructed in accordance with the relevant Queensland Government guideline/s.	Designed by a SQP.
				Stream bank erosion rates	Diversion designed by a SQP to achieve minimal erosion rates.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
		Sustainable land use	Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrients, trace elements) of topsoil and in soil profiles support the proposed land use.	Certification by a SQP that the topsoil chemical properties do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <1.2 dS/m. • Soil pH is between 5.5 and 10. • Soil Exchange Sodium Percentage (ESP) is <20 per cent. Adequate macro and micro-nutrients are present. Certification by a SQP that the subsoil chemical properties to a depth of 1m do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <3.7 dS/m. • Soil pH is between 3.3 and 9.5. • Soil Exchange Sodium Percentage (ESP) is <42 per cent
				Physical properties (e.g. depth of top soil, plant available water capacity (PAWC)).	Certification by a SQP that the soil physical properties (e.g. rockiness, depth of soil (including topsoil), wetness, plant available water capacity (PAWC), surface condition) are such that conditions are adequate for plant growth. For example, suitability for beef cattle grazing land use in accordance with Department of Minerals and Energy (DME) 1995 *Land Suitability Assessment Techniques in Technical Guidelines for the Environmental Management of Exploration and Mining*.
Surface water facilities	• Drainage line and diversions	Long-term safety	Structurally sound and safe for persons and	Assessed and approved by a SQP for structural soundness.	Areas designed by SQP as being structurally sound.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
	• Dams (all storage types) • Co-disposal dams • Levees		animals with no hazardous materials	Contaminated land assessment.	Evidence provided by SQP in contaminated land assessment report that: - land is not contaminated land; or - where land is identified as contaminated land, action has been taken to remediate the land to prevent serious environmental harm to a person, animal or another part of the environment; or - where land is identified as contaminated land, it can be used for stated uses with further management.
				Presence of heavy metals and toxic materials.	Action taken to prevent contamination.
				Fauna species on-site.	Evidence of native fauna using the area.
		Non-polluting	Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials.	Action taken to prevent ongoing exposure.
				Contaminated land assessment.	Contaminated land is managed appropriately in accordance with the relevant administering authority guideline/s. A suitably qualified and experienced person has certified that contamination will not occur.
			Polluted water contained on-site	Downstream and upstream surface and groundwater monitoring.	Monitoring results indicate site-caused pollution has not occurred.
				Appropriate decommissioning of regulated structures and other dams.	Certification by a suitably qualified and experienced person that all regulated structures (dams and levees) have been decommissioned and rehabilitated.
			Diversion design and maintenance	Stream bank stability.	Stream banks no longer require ongoing management.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
			achieves appropriate erosion rates	Surface water monitoring required under the environmental authority indicates similar water quality between the upstream and downstream monitoring points.	Monitoring results indicate site-caused pollution has not occurred.
		Stable landform	Very low probability of slope slippage or failure with serious environmental consequences	Past record of slope failure.	Nil records of slope failure; if slope failure has occurred it is rectified and ongoing design accounts for the previous failure.
			Landform design achieves appropriate erosion rates	Slope angle and length.	Designed as appropriate by a SQP.
				Maximum slope ranges are as follows: Co-disposal Facility Top = 11.5° Co-disposal Facility Wall = 11.5°	Slope requirements are met.
				Engineered structures to control water flow.	Water flows occur as designed.
				Rates of “soil” loss.	Soil loss is minimal as assessed by a SQP or reflected in downstream monitoring points.
				Dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in the corresponding reference sites.	Erosion rills and gullies are similar in characteristics to reference sites.
			Vegetation cover to minimise erosion	Vegetation type and density.	Certification that the vegetation type and density suit the underlying soil characteristics and are similar in composition and density to the reference site.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				Foliage protective cover.	Healthy and abundant.
				Leaf litter, humus, depth of growing medium.	Growing medium depth allows suitable vegetation to grow.
			Very low probability of rock falls with serious environmental consequences	Geotechnical studies.	Designed as low probability by SQP.
				Past record of rock falls.	Past record shows nil rock falls or when they have occurred that appropriate actions have occurred to rectify the issue.
			The diversions and run off drainage lines mirror natural stream functions	Designed and constructed in accordance with the relevant Queensland Government guideline/s.	Designed by a SQP.
				Stream bank erosion rates.	Diversion designed by a SQP to achieve minimal erosion rates.
		Sustainable land use	Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrients, trace elements) of topsoil and in soil profiles support the proposed land use.	Certification by a SQP that the topsoil chemical properties do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <1.2 dS/m. • Soil pH is between 5.5 and 10. • Soil Exchange Sodium Percentage (ESP) is <20 per cent. Adequate macro and micro-nutrients are present. Certification by a SQP that the subsoil chemical properties to a depth of 1m do not limit the suitability of the land for the intended land use and are consistent with the following: • Soil salinity content is <3.7 dS/m. • Soil pH is between 3.3 and 9.5. • Soil Exchange Sodium Percentage (ESP) is <42 per cent.

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
				Physical properties (e.g. depth of top soil, plant available water capacity (PAWC)).	Certification by a SQP that the soil physical properties (e.g. rockiness, depth of soil (including topsoil), wetness, plant available water capacity (PAWC), surface condition) are such that conditions are adequate for plant growth. For example, suitability for beef cattle grazing land use in accordance with Department of Minerals and Energy (DME) 1995 *Land Suitability Assessment Techniques in Technical Guidelines for the Environmental Management of Exploration and Mining*.

Appendix 3. Coordinator-General's recommendations

Recommendations for other approvals

This section includes recommendations made under section 52 of the SDPWO Act. The recommendations relate to approvals under Acts other than the SP Act or EP Act which require the preparation of an EIS or a similar statement to address the environmental effects for the project.

While the recommendations guide the assessment managers in assessing the applications, they do not limit their ability to seek additional information nor power to impose conditions on any development approval required for the project.

Each recommendation nominates the entity responsible for implementing the conditon.

Schedule 1. Approvals under the *Land Act* 1994

Recommendation 1. Stock routes

The entity responsible for ensuring this recommendation is implemented is DNRM.

The north to south stock route (403WHIT) must remain open (including the existing access to the Suttor River) and be maintained to its current standard.

(a) The proponent must document and implement management measures for stock routes impacted by the project that:

  (i) provide safe passage for stock, personnel and the general public

  (ii) maintain stock routes in accordance with any agreements reached with landholders, the Isaac Regional Council or the administering authority.

Schedule 2. Approvals under the *Nature Conservation Act* (1992)

Recommendation 2. Threatened species

The entity responsible for ensuring this recommendation is implemented is DEHP.

(a) Prior to the commencement of construction activities, a suitably qualified and experienced person must develop impact mitigation and management measures that maximise the ongoing protection and long-term conservation of threatened species known or likely to occur within the project area. Mitigation and management measures must:

  (i) detail actions and procedures to be followed during the pre-construction, construction, operational and (if appropriate) rehabilitation phases of the project

  (ii) be supported by a program of monitoring and reporting to facilitate adaptive management of the action and procedures

  (iii) be consistent with the provisions of the *Nature Conservation Act 1992* (Qld).

(b) All identified impact mitigation and management and reporting and monitoring measures must be implemented for all stages of the project construction and operations.

Recommendation 3. Monitoring program for post-release fauna survival

The entity responsible for ensuring this recommendation is implemented is DEHP.

The proponent must engage a suitably qualified and experienced person to locate suitable habitat for relocated fauna, particularly turtles, to optimise post-release survival, and develop a post release monitoring program where appropriate.

Schedule 3. Approvals under the *Transport Infrastructure Act 1994*

Recommendation 4. General

The entity responsible for ensuring this recommendation is implemented is DTMR.

(a) At all times and for each stage of the project, the proponent must implement all necessary measures to mitigate adverse impacts of project traffic on and maintain the safety, condition and efficiency of state-controlled and local roads used for the project.

(b) In the event that agreement cannot be reached between the proponent and the administering authority, the matter may be referred to the Coordinator-General, by either party, for resolution.

Recommendation 5. Impact mitigation program

The entity responsible for ensuring this recommendation is implemented is DTMR.

(a) An impact mitigation program must be documented and finalised at least three months prior to the commencement of project construction, or some other time period agreed in writing with DTMR, and will address the following:

  (i) construction of any required works (including site accesses) as and when stated in the updated road impact assessment (RIA)

  (ii) payment of any contributions towards the cost of works, rehabilitation or maintenance as and when stated in the updated RIA

  (iii) undertake or implement any other action as and when stated in a road-use management plan (RMP)

  (iv) actions or payments as otherwise agreed in writing with DTMR and/or the IRC or in an infrastructure agreement.

Recommendation 6. Road impact assessment

The entities responsible for ensuring this recommendation is implemented are DTMR and the relevant local government authority (LGA) for impacted local roads.

(a) The proponent, in consultation with DTMR and the relevant LGA, must update the road impact assessment (RIA) for each stage of the project to quantify the predicted impacts from project traffic on the safety, efficiency and condition of state-controlled and local roads. The updated RIA must:

(i) be developed in accordance with the DTMR *Guidelines for Assessment of Road impacts of Development (2006) (GARID)* [40] and/or as required by the relevant LGA and include a completed DTMR 'Transport Generation proforma' from DTMR detailing project-related traffic and transport generation information or as otherwise agreed in writing with DTMR and the relevant LGA

(ii) use DTMR Mackay/Whitsunday's 'Road Impact Assessment' spread sheet using current regional rehabilitation rates and maintenance rates for the updated assessment of pavement impacts

(iii) include the traffic generated by importing reagents and cement into Glenden which are then transported to the mine site (AEIS Volume 3 tables 4-5 to 4-9)

(iv) include an assessment of the adequacy of all intersections impacted by the project, including Ewan Drive and Perry Drive at Glenden and the intersections of Collinsville-Elphinstone Road with Suttor and Bowen Development Roads

(v) document all the assumptions and methodologies that have not been previously agreed in writing with DTMR and relevant LGA, prior to RIA finalisation

(vi) detail the final impact mitigation proposals, listing infrastructure-based mitigation strategies, including contributions to road works/maintenance and summarising key road-use management strategies

(vii) be submitted to DTMR and/or the relevant LGA for review six months prior to the commencement of significant construction works[41], or as otherwise agreed with DTMR and/or the relevant LGA.

Recommendation 7. Road-use Management Plan

The entities responsible for ensuring this recommendation is implemented are DTMR and the relevant LGA for impacted local roads.

(a) The proponent, in consultation with DTMR and the relevant LGA, must prepare a road-use management plan (RMP) for each stage of the project. The RMP must

(i) be developed in accordance with DTMR's *Guide to Preparing a Road-use Management Plan*[42] and/or as required by the relevant LGA, with a view to also optimising project logistics and minimising road-based trips on all state-controlled and local roads

[40] Available at http://www.tmr.qld.gov.au/business-industry/Technical -standards-publications.aspx
[41] Significant construction works means physical construction, including significant and continuous site preparation work such as major clearing or excavation for foundations or the placement, assembly or installation of facilities or equipment at any site related to the project.
[42] Available from TMR Regional Offices or Planning Management Branch, Brisbane.

(ii) include a table, available from DTMR, listing RMP commitments and provide confirmation that all works and road-use management strategies have been designed and/or will be undertaken in accordance with all relevant DTMR standards, manuals and practices[43] and/or as required by the relevant LGA

(iii) be submitted to DTMR and/or the relevant LGA for review six months prior to the commencement of significant construction works, or as otherwise agreed with DTMR and/or the relevant LGA.

Recommendation 8. State-controlled road access

The entities responsible for ensuring this recommendation is implemented are DTMR and the relevant LGA for impacted local roads.

(a) The proponent, in consultation with DTMR and the relevant LGA, must, prior to the commencement of significant project-related construction works:

(i) upgrade any necessary intersection/accesses and undertake any other required works in state-controlled and/or LGA road reserves, in accordance with all current DTMR and/or LGA road planning and design policies, principles and manuals.

(A) The southern access is to be a CHR/AUL configuration with a 110 km/h design speed at a location agreed to by DTMR.

(B) The northern access configuration and location are to be agreed to closer to construction of this access, anticipated in year 15, and prior to significant construction works in the north phase of the project as defined in the EIS.

(ii) obtain the relevant licenses and permits under the *Transport Infrastructure Act (Qld) 1994* for works and project facilities/infrastructure within the state-controlled road corridor.

(iii) undertake any required works and other impact mitigation strategies as required by the RIA and RMP, in accordance with all current DTMR and LGA policies and standards.

Recommendation 9. Required roads works

The entity responsible for ensuring this recommendation is implemented is DTMR.

(a) The proponent must, prior to the commencement of any significant construction works, construct and complete the required road works and/or make contributions towards works as required, unless otherwise agreed in writing with the DTMR Mackay/Whitsunday Regional Office:

(i) Construct any required road works before commencement of project-related traffic

(ii) prior to undertaking any works, obtain the relevant licenses and permits under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor. As required under the definition below for permits,

[43] Available at: http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications.aspx

any required plans, permits and TMPs must be submitted to DTMR three months prior to commencement of project construction traffic

(iii) implement the approved TMP for the works during construction and commissioning of the above mentioned intersection upgrade.

Definitions for Schedule 3 recommended conditions follow:

Infrastructure agreements

Infrastructure agreements are negotiated between the proponent and DTMR. Agreements are intended to formalise arrangements about transport infrastructure works, contributions and road-use management strategies detailed and required under the approved RIA and RMP.

(a) The infrastructure agreement/s should identify and incorporate, but are not limited to, the following:

(i) project-specific works and contributions required to upgrade impacted road infrastructure and vehicular access to project sites as a result of the proponent's use of state-controlled and local roads by project traffic

(ii) project-specific contributions towards the cost of maintenance and rehabilitation to mitigate road or pavement impacts on state-controlled and local road infrastructure

(iii) infrastructure works and contributions associated with shared (cumulative) use of state-controlled and local road infrastructure by other projects subject to an EIS

(iv) performance criteria that detail protocols for consultation about reviewing and updating of project-related traffic assessments and impact mitigation measures that are based on actual traffic volume and impacts, should previously advised project details, traffic volumes and/or impacts change

(v) the proponent's undertaking to fulfil all commitments as detailed in a table of RMP commitments.

(b) Any infrastructure agreement between the proponent, DTMR and the relevant LGA should be in place three (3) months prior to commencement of project construction, or as otherwise agreed in writing between the proponent, DTMR and the relevant LGA.

Permits, approvals and traffic management plans

To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three months, or such other period agreed in writing with DTMR and/or the relevant LGA, prior to the commencement of significant construction works or project-related traffic:

(a) submit detailed drawings of any works required to mitigate the impacts of project-related traffic for DTMR and the relevant LGA review and approval

(b) obtain all relevant licenses and permits required under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor (s33 for road works approval, s62 for approval of location of vehicular accesses to state

roads and s50 for any structures or activities to be located or carried out in a state-controlled road corridor)

(c) prepare a Heavy Vehicle Haulage Management Plan for any excess mass or over-dimensional loads for all phases of the project in consultation with DTMR's Heavy Vehicles Road Operation Program Office, the Queensland Police Service and the relevant LGA, as required by the *Transport Operations(Road Use Management) Act 1995*

(d) prepare TMPs in accordance with DTMR's *Guide to preparing a Traffic Management Plan*[44] and/or as required by the relevant LGA. A TMP must be prepared and implemented during the construction and commissioning of each site where road works are to be undertaken, including site access points, road intersections or other works undertaken in the state-controlled road corridor.

Schedule 4. Approvals under the *Water Act 2000*

Recommendation 10. General

The jurisdiction for this recommended condition is with DNRM.

(a) All plans, modelling and monitoring programs required by these conditions must be certified by a suitably qualified and experienced person.

(b) All plans and monitoring programs required under these conditions must be implemented.

(c) The extraction of groundwater as part of the project must not directly or indirectly adversely affect any watercourse, lake, wetland or spring unless authorised under these conditions or by another authorisation under the *Water Act 2000.*

(d) Should a water resources plan that refers to groundwater in the Belyando-Suttor section of the Water Resource (Burdekin Basin) Plan 2007 be prepared during the life of the project, the project must not impact on the outcomes of the plan for the duration of the project.

(e) Watercourse diversions must be undertaken in accordance with either the relevant:

  (i) conditions of an environmental authority for a resource activity issued under the *Environmental Protection Act 1994* or,

  (ii) Department of Natural Resources and Mines watercourse guideline, *Works that interfere with water in a watercourse: watercourse diversions*, 2014.

  (iii) Department of Natural Resources and Mines watercourse guideline, for example the *Central West Water Management and Use Regional Guideline: Watercourse Diversions – Central Queensland Mining Industry version 5,* Department of Natural Resources and Mines, 2011.

(f) When authorised, excavating or placing fill in a watercourse, lake or spring necessary for and associated with project operations must be undertaken in accordance with the Department of Natural Resources and Mines *Riverine Protection Permit Exemption Document.*

[44] Available from TMR Regional Offices of Planning Management Branch, Brisbane

Note: A riverine protection permit under the *Water Act 2000* is required for any activity that cannot be undertaken in accordance with the Riverine Protection Permit Exemption Document.

Recommendation 11. Modelling impact on water resources

The jurisdiction for this recommended condition is with DNRM

(a) Unless specified in a water licence or permit issued under the *Water Act 2000*, the proponent must undertake the following:

(i) no later than two years after the commencement of project activities that may impact on water resources, update the Byerwen Coal project groundwater model predicting changes in groundwater levels as a result of the project activities.

(A) The updated model required by condition (a)(i) must incorporate the results of the monitoring program required by condition E3 of the draft environmental authority.

(B) The updated model required by condition (a)(i) must be reviewed by an independent suitably qualified person to evaluate the appropriateness of the model used, evaluate the accuracy of the predicted changes in groundwater levels, and recommend actions to ensure the accuracy of the model predictions.

(C) No later than two years after the commencement of project activities that may impact on water resources, a report on the accuracy (including any recommendations) of the updated model must be submitted to the administering authority.

(ii) Unless specified in a water licence or permit issued under the *Water Act 2000*, the proponent must undertake the following:

(A) The Byerwen Coal project groundwater model referred to in condition (a)(i) must be updated at the following times:

(1) every five years from the commencement of project activities, or

(2) at appropriate intervals specified by the administering authority in writing, when the observed water levels measured in accordance with condition E5 of the draft environmental authority are not consistent with the groundwater levels predicted in the Byerwen Coal project model.

(B) Within one month of the model update timeframe specified in condition (a)(ii)(A), a model update (required by condition (a)(i)) and a report interpreting the results from the updated model must be submitted to the administering authority.

Recommendation 12. Water security

The jurisdiction for this recommended condition is with DNRM.

(a) Prior to the commencement of project activities that may impact on water resources the proponent must develop a plan to address impacts to water supply for water users potentially affected by project activities

(b) The plan required by condition Recommendation 2(a) must identify the water supply impacts to affected water entitlement holders during and following the project activity

(c) The plan required by condition Recommendation 2(a) must identify the proposed compensatory measures to affected water entitlement holders, and outline how those measures will meet requirements of condition (f)

(d) The plan required by condition Recommendation 2(a) must be developed to the satisfaction of the administering authority

(e) The plan required by condition Recommendation 2(a) must be updated to include additional affected water entitlement holders where identified through monitoring data and/or updated groundwater modelling

(f) The compensatory measures must provide an:

  (i) alternative long-term supply of water that is equivalent to the loss attributable to the project activities, is of suitable quality for the intended purpose, and does not increase the cost of operating that supply, or

  (ii) alternative arrangement.

(g) The compensatory measures required by condition Recommendation 2(f) must be agreed with all existing affected water entitlement holders prior to the commencement of project activities that may impact on water resources.

Schedule 5. Approvals under the Environmental Protection and Biodiversity Conservation Act 1994

It is recommended that the Commonwealth consider the following recommended conditions of approval in addition to the State's conditions listed in Appendix 1 and Appendix 2.

Recommendation 13. Disturbance limits

(a) The project area is the area designated as six Mining Lease Applications (MLA) 10355, 10356, 10357, 70434, 70435, 70436. The approval holder must not clear outside the project area.

(b) The approval holder must not clear more than:

  (i) 1047 hectares of primary habitat for the Squatter pigeon (southern)

  (ii) 637.5 hectares of primary habitat for the Ornamental snake

  (iii) 606.2 hectares of primary habitat for the Black-throated finch (southern)

  (iv) 316 hectares of Brigalow (*Acacia harpophylla* dominant and co-dominant)

  (v) 84.4 hectares of Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin

  (vi) 18.0 hectares of Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions

(c) If the disturbance limits stated in Recommendation 13(b) of this approval are predicted to be exceeded, the approval holder must contact the Department of the Environment in writing 20 business days before reaching the disturbance limit and provide the following for the Minister's approval:

  (i) the actual and predicted amount of disturbance in hectares for each EPBC Act listed species and community

  (ii) justification why the approved disturbance limits require increasing, alternatives, and proposed actions to avoid, mitigate and manage impacts

  (iii) an assessment of the impact and residual impact to the EPBC Act listed species or community in accordance with the EPBC Act Significant Impact Guidelines

  (iv) a proposal to offset additional impacts to EPBC Act listed species and communities in accordance with the EPBC Act Environmental Offsets Policy in force at the time.

Recommendation 14. Biodiversity Offset Management Plan

(a) The approval holder must submit a Biodiversity Offset Management Plan (BOMP) to the Department of the Environment for the Minister's approval, outlining how offsets to address the residual impacts to Brigalow (*Acacia harpophylla* dominant and co-dominant), Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions, Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin, the Ornamental snake and the Squatter pigeon (southern), will be managed. The approved BOMP must be implemented.

(b) The BOMP must be submitted for approval within twelve months after the commencement of construction. Clearing of EPBC Act listed species habitat and listed ecological communities must not occur until the BOMP is approved by the Minister in writing.

(c) The BOMP must include, but is not limited to:

  (i) maps of the offset area/s inclusive of the distribution and extent (in hectares) of the EPBC Act listed species and communities to be offset in electronic Geographic Information System format

  (ii) evidence that the offsets are consistent with the department's *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy

  (iii) details of how the offset area/s have been or will be legally secured to provide long-term protection

  (iv) detailed on-ground surveys, complying with relevant survey guidelines, and description of the baseline condition, attributes and values of the offset area/s with respect to EPBC Act listed species and communities

  (v) management measures (including timing, frequency and longevity) for each of the EPBC Act listed species and communities and other vegetation within the offset area/s with written evidence of input from a suitably qualified expert who has relevant expertise in the management of native vegetation of the Bowen Basin

  (vi) details of how the management measures align with the relevant conservation advice, recovery plans and threat abatement plans for the EPBC Act listed species and communities to be offset

  (vii) discussion of connectivity of the offset area/s with other habitats and biodiversity corridors

  (viii) a description of the risks to the successful implementation of the BOMP, including mitigation measures and residual risk ratings

  (ix) a monitoring program for the offset area/s which must:

    (A) clearly set out performance indicators and milestones

    (B) detail how the success of the management measures against the performance indicators and milestones will be measured, recorded and reported

    (C) include monitoring scope and parameters, timing, frequency, triggers and corrective actions

    (D) detail how adaptive management strategies will be incorporated

    (E) outline how compliance will be reported

    (F) detail who will be undertaking monitoring, reporting, review, and implementation of the BOMP (if this person is not the approval holder).

(d) The BOMP must be updated, within a timeframe specified by the Minister, to include any changes to the offsets approved by the Minister. Updates must be consistent with the requirements in Recommendation 14(c).

(e) The approval holder must, within two years of the commencement of construction (or as required under relevant Queensland legislation), register a legally binding conservation mechanism to provide long-term protection to the offset area/s approved by the Minister in the BOMP.

Note 1: To ensure efficiency, the approval holder may prepare and align the BOMP required under the conditions of approval with the requirements of the Biodiversity Offset Strategy required under the Queensland environmental authority for the project, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Definitions for this recommendation include:

Commencement of Construction: any preparatory works required to be undertaken including clearing vegetation, the erection of any onsite temporary structures and the use of heavy duty equipment for the purpose of breaking the ground for mining, buildings or infrastructure.

Recommendation 15. Groundwater Monitoring and Management Plan

(a) The approval holder must submit a Groundwater Monitoring and Management Plan (GMMP) to the Department of the Environment for the Minister's approval. The approved GMMP must be implemented.

(b) The GMMP must be approved by the Minister in writing prior to the commencement of dewatering activities in the mining pits depicted in Figure 3 of the Environmental Management Plan for the project.

(c) The GMMP must include, but is not limited to:

  (i) the groundwater quality and level triggers as described in Schedule E of the Queensland environmental authority

  (ii) a detailed description of the actions, including timeframes, the approval holder will take if groundwater quality and or level triggers (referred to in Condition [number] of this approval) are exceeded or predicted to be exceeded

  (iii) a strategy to conduct a private landholder bore survey to determine water supply bores and water users in the vicinity of the project that may be impacted by mining activities and the potential to incorporate those bores into the groundwater monitoring program

  (iv) details of how the existing groundwater monitoring program will be expanded to better determine surface water–groundwater interaction, including monitoring locations, parameters to be measured, monitoring frequency and reporting requirements

  (v) a groundwater model to simulate and quantify groundwater drawdown extent and flow impacts on the Suttor River, and validate the assumptions and potential risks and impacts of the project on groundwater resources identified in the environmental impact statement documents. The model must be developed with reference to the National Water Commission

Groundwater Modelling Guidelines[45] and must include a monitoring strategy to validate the model.

(vi) the methods, frequency and timeframes in which the GMMP and groundwater model will be reviewed.

(d) The Minister for the Environment may by written request, require the GMMP to be reviewed by a suitably qualified and experienced person. Following any review, the GMMP must be revised, updated and submitted to the Minister for approval.

Note 2: To ensure efficiency the approval holder may prepare and align the GMMP required under the conditions of approval with the requirements of the groundwater monitoring program required under the Queensland environmental authority for the project, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Recommendation 16. Groundwater quality and levels

(a) The approval holder must notify the Department of the Environment in writing within 10 business days if the groundwater quality and or level triggers referred to in Condition [insert number] of this approval are exceeded, and the results of required investigations indicate the exceedence is the result of mining activities. If requested the approval holder must provide copies of any exceedance investigation documents to the Department of the Environment, in a timeframe agreed in writing by the Department, which state the cause, response, and actions undertaken to prevent further occurrences.

[45] Barnett B, et al., Sinclair Knight Merz and National Centre for Groundwater Research and Training, *Australian Groundwater Modelling Guidelines (Waterlines Report Series No. 82)*, National Water Commission, Canberra, 2012, **https://nwc.gov.au, v**iewed 28 May 2014.

Appendix 4. Social impact assessment

Table A1 Social impact assessment action plans

HOUSING AND ACCOMMODATION

Introduction	
Purpose	The purpose of this plan is to ensure accommodation is available for project workforces and to provide accommodation choice
Objectives	To ensure that the construction workforce is accommodated To ensure that the operations workforce is accommodated and has access to accommodation choice To ensure accommodation development is of at least a similar standard and quality as existing accommodation

Impacts

Impact	Nature	Phase	Sensitivity	Magnitude	Significance
Increased temporary accommodation requirements	Negative	Construction	Moderate	Moderate	Moderate
Increased permanent accommodation requirements	Negative	Operation	High	Moderate	High
Changes to existing urban design of Glenden	Negative	Construction Operation	Moderate	Moderate	Moderate

Housing and accommodation—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Acquire land in Glenden suitable for development of construction and contractors accommodation village • Acquire land in Glenden suitable for development of houses, duplexes and operations accommodation village	• Queensland Government • Byerwen Coal • Isaac Regional Council	At approval	• Land in Glenden is acquired
• Formulate and submit an application for a Glenden Urban Design Master Plan that provides the blueprint for residential growth and development in Glenden as part of the process to implement the accommodation strategy	• Byerwen Coal • Accommodation developer • Isaac Regional Council • Whitsunday Regional Council	Prior to development of residential accommodation	• Byerwen Coal submits development application for Glenden Urban Design Master Plan • Isaac Regional Council approves Glenden Urban Design Master Plan

Housing and accommodation—mitigation			
• Develop accommodation village sufficient to house the construction workforce and contractors • Appoint accommodation facility managers and maintenance staff	• Byerwen Coal • Isaac Regional Council	Pre-construction	• Construction employees accommodated in accommodation village • Contractors accommodated in accommodation village • Accommodation is managed and maintained
• Offer housing choice for operations workforce and managements staff • Develop accommodation (houses/duplexes/accommodation village) for operations workforce and management staff • Appoint accommodation facility managers and maintenance staff	• Byerwen Coal • Isaac Regional Council	Pre-operations	• Operations workforce accommodated in choice of house, duplex or accommodation village • Management staff accommodated in choice of house, duplex or accommodation village • Accommodation is managed and maintained
• Promote the allocation of Royalties for the Regions funding to enhance the liveability of Glenden • Identify community priorities through consultation with community organisations, residents, schools, other industry, local and state government (SEG) • Establish relevant links to other organisations and representative groups to identify community priorities and recommended actions	• Byerwen Coal • Industry • Isaac Regional Council • Whitsunday Regional Council •	Ongoing	• Agreed community priorities and list of recommendations to progress through Glenden SEG • Recommended actions/projects are assigned to relevant/linked organisation to be progressed • Council/s agree to submit an application for Royalties for the Regions funding for project/s that deliver improvements for the Glenden community

WORKFORCE MANAGEMENT AND LOCAL BUSINESS AND INDUSTRY CONTENT

Introduction	
Purpose	The purpose of this plan is to: Identify actions that maximise the employment and business opportunities and stimulate regional training opportunities. provide adequate protection to Aboriginal cultural heritage and ensure indigenous people are aware of employment and training opportunities at the mine
Objectives	Maximise the benefits associated with generation of construction and operations employment opportunities including for under-represented groups Stimulate training and skills development Provide opportunities for up-skilling of local workforce Generate opportunities for local businesses Monitor increases to local cost of living To provide support in securing employment and training opportunities for indigenous people To generate business opportunities for indigenous Businesses To ensure that risks to damage or destruction of indigenous people's cultural heritage are properly managed

Impacts

Impact	Nature	Phase	Sensitivity	Magnitude	Significance
Generation of construction employment	Positive	Construction	Moderate	Moderate	Moderate
Generation of operations employment	Positive	Operation	High	Moderate	High
Stimulation of training, skilling and up-skilling development opportunities	Positive	Construction Operation	Moderate	Moderate	Moderate
The project contributing to regional skills shortages	Negative	Construction Operation	Moderate	Moderate	Moderate
Difficulties attracting and retaining skilled staff for local businesses	Negative	Construction Operation	Moderate	Moderate	Moderate
Generation of opportunities for local businesses	Positive	Construction Operation	Moderate	Moderate	Moderate
Loss or destruction of items or areas of heritage value	Negative	Construction Operation	Moderate	Moderate	Moderate

Injection of wealth into local and regional economy	Positive	Construction Operation	High	Moderate	High
Increase to cost of living in local area	Negative	Operation	Moderate	Moderate	Moderate

Workforce management and local business and industry content—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Attraction of a skilled construction workforce through: – rigorous contractor selection processes – provision of workforce accommodation – equal opportunity policy • Notify relevant organisations of opportunities • Liaison with FIFO Coordinators, government agencies, training and other education facilities	• Byerwen Coal • Contractors • Employment and training organisations • FIFO Coordinators	Pre-construction (phase 1 and 2)	• Attraction of required construction workforce • Ongoing liaison with relevant organisations
• Attraction of a skilled operations workforce through: – rigorous contractor selection processes – advertisement of employment opportunities and recruitment strategy – provision of workforce accommodation and accommodation choice – provision of incentives to live locally – equal opportunity policy • Notify relevant organisations of opportunities • Create pathways with school and training organisations • Liaison with FIFO Coordinators, employments contacts in government agencies and training and other education facilities	• Byerwen Coal • Contractors • Employment and training organisations • FIFO Coordinators • Glenden State School	Pre-operations (phase 1 and 2)	• Attraction of required operations workforce • Established pathways with school • Ongoing liaison with relevant organisations • Target – 80 per cent of workforce live in Mackay, Isaac and Whitsunday regions

Workforce management and local business and industry content—mitigation			
• Offer at least two apprenticeships • Expand apprenticeship program once operational • Implement traineeship and graduate program once operational • Promote employment opportunities • Provide forecast workforce requirements to Skills Queensland, Registered Training Organisation (RTO's), TAFE and schools	• Byerwen Coal • Principal mining contractor • Skills Queensland, Construction Skills Queensland • Department of Education, Training and Employment • Registered training organisations and TAFE	Life of project	• Two apprenticeships filled (target – increase no. of apprenticeships during operations) • Target – increase graduate student and trainee opportunities during operations • Regular contact with interested employment and training organisations providing contact details of HR personnel and web links to employment opportunities
• Investigate pathways for up-skilling people for employment and business opportunities with training, employment and economic development organisations and government agencies • Ongoing consultation with relevant organisations about employment and training opportunities and strategies • Review training strategies to incorporate useful suggestions as a result of consultation outcomes Implementation of rigorous contractor selection processes • Assist skills development through provision of information to Skills Queensland and the promotion of employment and training opportunities	• Byerwen Coal • Contractors • Skills Queensland, Construction Skills Queensland • Department of Education, Training and Employment • Registered training organisations and TAFE • Glenden State School	Life of project	• Regular contact with organisations and government agencies to provide updates about workforce requirements • Training strategies are reviewed taking into account useful feedback • Notification of employment and training opportunities on relevant websites and distribution of advertisements to relevant organisations
• Currently eight QCoal educational grants awarded (Collinsville) • Introduce educational grants program to Glenden and surrounds (two grants per year) • Eight education grants recipients currently offered vacation work (offer future students vacation work opportunity) • Implement program for linkage between mine site and high school students	• Byerwen Coal • QCoal Foundation • Students • Glenden State School	Life of project	• Two education grants awarded each year to Glenden and surrounds • Education grant recipients undertake work experience • High school students are engaged in mine site linkage program

Workforce management and local business and industry content—mitigation			
• Establish productive partnerships with the business community • Promote procurement opportunities utilising the Industry Capability Network (ICN) Gateway and WIWD • Establish productive partnerships with the business community and industry associations • Promote supply opportunities to suppliers within the region • Liaise with Industry Capability Network (ICN) Gateway and Whitsunday Industrial Workforce Development (WIWD) program to identify potential suppliers • Promote the ICN Gateway and WIWD to local and regional suppliers • Provide notification of work packages to ICN Gateway and WIWD • Provide project progress updates to local and regional suppliers via email updates and presentations to industry groups • Continue to support economic development initiatives • Monitor and evaluate the effectiveness of the program through a count of the number of suppliers from the local and regional areas	• Byerwen Coal • Contractors • ICN Gateway • Department of State Development, Infrastructure and Planning • Local businesses • Industry associations • Isaac Regional Council • Whitsunday Regional Council	Life of project	• Project and contractors' work packages are advertised on the Industry Capability Network (ICN) Gateway, WIWD and on website • Regular contact with businesses and industry associations • QCoal makes regular presentations to industry • Report on list of local and regional suppliers
• Promote the release of adequate land by local and state agencies to meet demand for residential and industrial purposes • Councils provide assistance to local businesses to respond to industry requirements through land release and development applications • Implement the accommodation strategy, which provides affordable accommodation options • Monitor issues raised with respect to local living costs through engagement mechanisms • Demonstrate intention to secure and develop land • Collaborate with relevant stakeholders to develop indicators to monitor cost of living	• Byerwen Coal • Isaac Regional Council • Whitsunday Regional Council • Queensland Department of State Development, Infrastructure and Planning • Industry • Businesses	Life of project	• Councils release industrial and residential land prior to the start of construction • Councils approve business expansion plans • Land acquisition process is under way • Accommodation proposal submitted to council • Report on request on changes to cost of living via agreed indicators •

Workforce management and local business and industry content—mitigation			
• Byerwen Coal's contractors to provide the opportunity for two apprenticeships to indigenous people • Currently provide two education bursaries each year (target four per year)	• QCoal • Contractors • Department of Education and Training Queensland • DATSIMA • Traditional Owners		• Indigenous apprentices at mine (two at 4Mtpa, two at 6Mtpa and two each two years after) • Two bursaries are currently granted • Target – four education bursaries per year
• Byerwen Coal's contractors to identify appropriate methods, if not already in place, to recruit and retain indigenous Australians in consultation with Traditional Owners, DATSIMA, Skills Queensland and other relevant indigenous community representatives • Employ Indigenous Relations Manager • Employ two Indigenous workers (Target – set a per cent of indigenous workers target once baseline conditions are established during operations)	• Byerwen Coal • Contractors • Traditional Owners • DATSIMA • Skills Queensland • Other relevant indigenous community representatives	Life of project	• Contractors' recruitment and workforce management strategies support indigenous applicants • Regular contact with relevant indigenous groups and agencies regarding employment opportunities and training (emails) • Two (at least) indigenous people are employed at the mine (target – increase number of indigenous employees beyond baseline, once established) • Indigenous relations manager employed

Workforce management and local business and industry content—mitigation			
• Identify appropriate business opportunities and invite applicable Traditional Owner Groups to apply • Distribute employment and business opportunities to Traditional Owners and indigenous employment agencies • Provide input into Leighton Contractors' indigenous business initiative • Coordinate further site visits to QCoal operations and developments to support Leighton Contractors' indigenous business initiative and provide input to program • Provide Leighton Contractors' indigenous business initiative with details of sub-contracting opportunities	• Byerwen Coal • Traditional Owners • DATSIMA	Life of project	• Regular contact with relevant organisations including TOs including providing a link to ICN Gateway • Traditional Owner Groups and indigenous employment agencies advised of applicable business opportunities (letter/email) • Site visits are undertaken with Leighton Contractors' indigenous business initiative staff • Input into indigenous business initiative • Sub-contracts are offered to traditional owners
• Finalised Cultural Heritage Management Plan for each relevant Traditional Owner group • Implementation of cultural awareness program as part of induction program for relevant staff and contractors	• Byerwen Coal • Contractors • Traditional Owners	Pre-construction	• Endorsed Cultural Heritage Management Plan • Cultural awareness component included in induction (target – 100 per cent workers complete induction) • Report on number of workforce inductions

HEALTH AND COMMUNITY WELLBEING ACTION PLAN

Introduction	
Purpose	The purpose of this plan is to • identify actions that address potential changes to social identity and cohesion in Glenden • identify actions that enhance the community and manage the impacts on social, health and community infrastructure and services
Objectives	• Manage changes to social identity and avoid social friction in the community • Facilitate the re-invigoration of Glenden • Address the need for appropriate support services • Maintain the standard of existing community infrastructure • Support community services to obtain the required resources to manage growth • Manage impacts of demand for community services with limited resources

Impacts

Impact	Nature	Phase	Sensitivity	Magnitude	Significance
Social identity of Glenden altered due to growth and redevelopment	Negative	Construction Operation	Moderate	Moderate	Moderate
Social friction resulting from creation of an 'us and them' dynamic	Negative	Construction Operation – Phase 1	Moderate	Moderate	Moderate
Reinvigoration of the Glenden community	Positive	Construction Operation – Phase 1	Moderate	Moderate	Moderate
Social health effects associated with shift work and commute	Negative	Construction Operation – Phase 1	High	Low	Moderate
Diminished rural and agricultural identity	Negative	Construction Operation	High	Low	Moderate
Real or perceived deterioration of the safety of Glenden	Negative	Construction Operation	Moderate	Moderate	Moderate
Increased demand On health services	Negative	Construction Operation	High	Moderate	High

Increased demand on essential services	Negative	Construction Operation	Moderate	Moderate	Moderate
Increased demand on educational services	Positive	Operation	High	Moderate	High
Increased demand on emergency services	Negative	Construction Operation	High	Moderate	High
Increased usage of recreational facilities and services (with capacity for growth	Positive	Operation	Moderate	Moderate	Moderate
Increased use of community infrastructure	Positive and Negative	Operation	Moderate	Moderate	Moderate
Lack of land allocation for provision of social and commercial services	Negative	Operation	Moderate	Moderate	Moderate
Amenity effects associated with increased traffic in residential areas	Negative	Construction Operation	Moderate	Moderate	Moderate
Traffic related incidents due to increased population	Negative	Construction Operation	Moderate	Moderate	Moderate
Increased demand on existing municipal infrastructure	Negative	Construction Operation	Moderate	Moderate	Moderate

Health and community wellbeing—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Retain details of community development and support initiatives until financial investment decision in project is made • Expand existing community grants program, through the QCoal Foundation, to support Glenden and surrounding areas with a budget of $200,000 a year • Consult community, industry, local and state government to understand community priorities and establish priorities for community grants (SEG and other consultation) • Establish open communication with the community and capture complaints (requiring a resolution) • Address social issues swiftly and appropriately • Develop and implement workforce wellbeing programs • Implement workforce management strategy including code of conduct • Invite speakers to promote services as toolbox talks • Promote access to support services for members of the workforce	• Byerwen Coal • Contractors • Isaac Regional Council • Whitsunday Regional Council • Queensland Police Service • Community facilities managers	Life of project	• Commitments to community development initiatives are made following FID • Feedback about involvement in community is positive • Feedback about how issues are addressed is positive • Community complaints register is updated • Community grants to be awarded (in line with Collinsville budget including grants, rates and royalties payments) • Rates and royalties are paid • Community groups state they have support from Byerwen Coal if asked • Inclusion of details about support services in induction programs and kits • Safety target of zero harm

Health and community wellbeing—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Provide housing choice to encourage local living • Acquire land • Develop and implement Glenden Urban Design Master Plan to guide residential development and address issues if they arise • Obtain support of state and local government for accommodation strategy • Integration of CPTED principles into Urban Design Master Plan	• Byerwen Coal • Accommodation developer • Isaac Regional Council • Whitsunday Regional Council	Life of project	• Byerwen Coal or its representative acquires land • Glenden State School principal has provided written support for accommodation development on surplus school land to attract families and couples to town and its positive impact on improving educational opportunities • Isaac Regional Council has provided written support for accommodation strategy and the linkages with Council's vision for strengthening communities • Isaac Regional Council endorses Glenden Urban design Master Plan/development application • Approved Urban Design Master Plan/ Development Application • Integration of CPTED principles into Urban Design Master Plan • Feedback about accommodation development and management is positive
• Support Isaac Council to preserve agricultural heritage and identity through the Isaac Region 2020 Vision Community Plan • Engage with landowners via SEG and ongoing consultation	• Byerwen Coal • Isaac Regional Council • Landowners	Life of project	• Engagement occurs with Isaac Regional Council (offers of meetings, teleconferences to IRC) • Attendance at SEG meetings • Ongoing landowner consultation

Health and community wellbeing—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Provision of on-site medical facilities • Promote the allocation of Royalties for the Regions funding to enhance the health and community infrastructure of Glenden • Monitor demand via feedback from service providers in relation to increasing workforce numbers • Develop and implement workforce well-being initiatives such as preventative health education, fatigue management, social participation • Principal sponsor of Royal Flying Doctor Service and support of auxiliary services such as mobile dental unit • Establish productive partnerships with health service providers • Obtain agreement with existing private medical practice to enable it to service growing demand.	• Byerwen Coal • Contractors • Accommodation facility management • Queensland Health • Glenden SEG • Isaac Regional Council • Whitsunday Regional Council	Life of project	• Health care provider feedback about demand on services is being managed • Inclusion of information in induction packs • Participation by workforce in initiatives or talks • Health professionals invited to present at toolbox talks • Council/s agree to submit an application for Royalties for the Regions funding for project/s that deliver improvements for the Glenden community • Community grants are awarded • Fund mobile dental service for three years (target - $1,000,000) • Workers are encouraged to use Australian Government's eHealth.gov.au - a secure online summary of a person's key healthcare information – and permit local hospitals and health care providers to access it • Private medical practice establishes arrangement to deliver health services to Glenden community
• Expand the existing community grants program through the QCoal Foundation, which will include the funding of education grants for Glenden and surrounds (two education grants to be awarded) • Provide Education Queensland/ Glenden School accurate information as to resident workforce and expected increases in student numbers • Continue to liaise with childcare providers to assist in planning for changing demand	• QCoal • Byerwen Coal • Contractors • Department of Education, Training and Employment • Glenden State School • Child care providers	Pre-operations	• Capacity of existing educational services not exceeded • Eight educational grants recipients in Collinsville area (awarded) • Two educational grants recipients in Glenden and surrounds • School is informed of workforce numbers and expected timeframes • Child care service is aware of workforce numbers and expected timeframes

Health and community wellbeing—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Liaise with emergency services to provide information about workforce numbers and timeframes • Develop a safety and health plan in response to assessed risk at site and the accommodation facilities outlining preventative measures including an emergency management plan • Establish productive partnerships with emergency service providers through: • mine site familiarisation with emergency service officers • invite emergency service officers to give toolbox talks • provide health and support resource information in induction packs to alleviate unnecessary emergency calls	• Byerwen Coal • Contractors • Queensland Police Services • Emergency Management Queensland • Isaac Regional Council • Local emergency service officers	Pre-construction	• Regular liaison with emergency services • Inclusion of information in induction packs • Emergency service officers invited to present at toolbox talks • Emergency services officers are familiar with site and site contacts • Relevant plans are implemented and adhered to
• Support developers of proposed social and commercial infrastructure developments to access and for identified requirements	• Byerwen Coal • Isaac Regional Council • Department of State Development, Infrastructure and Planning	Life of project	• Letters of support for developers of identified requirements • Attendance at meetings in support of release of land
• Implementation of a Traffic Management Plan which includes actions to address potential safety issues due to increased traffic • Manage traffic related project effects through: • reducing traffic by providing bus services for non-resident workforce for shift rotations • reducing traffic by providing bus services for daily mobilisation to site • Establish a road maintenance contribution scheme with relevant authorities • Provide adequate accommodation for all members of construction and operational workforces • Promote the allocation of Royalties for the Regions funding to enhance the provision of funding to adequately maintain regional and local roads.	• Byerwen Coal • Contractors • Isaac Regional Council • Queensland Department of Transport • Queensland Police Service • Local emergency service officers	Life of project	• Feedback that traffic issues are being addressed • Development and implementation of a project specific Traffic Management Plan • Provision of bus services for shift rotation and daily mobilisation (accommodation-mine site) • Establish approved road access into all new housing and accommodation sites • Close out of traffic-related safety issues • Council/s agree to submit an application for Royalties for the Regions funding for project/s that deliver improvements for the Glenden community

Health and community wellbeing—mitigation			
Mitigation actions	**Responsibility**	**Timeframe**	**Outcomes**
• Formulation and application of a Glenden Urban Design Master Plan which includes planning development of trunk infrastructure and services with capacity to meet estimated population growth	• Byerwen Coal • Isaac Regional Council • Queensland Department of State Development, Infrastructure & Planning	Prior to development of residential accommodation	• Isaac Regional Council endorsed Glenden Urban Design Master Plan through approvals and letter of support

STAKEHOLDER ENGAGEMENT STRATEGY

QCoal has an ongoing commitment to engage with the community of Glenden. As part of this commitment QCoal recognises that effective and transparent consultation is essential in building and maintaining the community's trust and in developing a positive ongoing relationship for the life of the project.

Underpinning the community consultation and stakeholder engagement strategy for the project are the following objectives:

- Introduce the project and announce the Coordinator-General's declaration of the Byerwen Coal Project as a significant project (complete)
- Provide the opportunity for input into the draft terms of reference for the environmental impact statement (complete)
- Establish an understanding of the community climate to shape community engagement activities (ongoing)
- Participate in a regular forum for community government and industry to work in partnership to identify and address community priorities (ongoing)
- Provide updates to the local community and key stakeholders about the project (ongoing)
- Identify issues and community perceptions related to potential environmental impacts of project design, construction and operation (ongoing)
- Validate and further develop an understanding of what in the community is important and the potential impact of the project on these values for input into the social impact assessment (complete for SIA - ongoing)
- Gather feedback and input into the development of mitigation and monitoring strategies for the SIMP (ongoing)
- Provide community with communication channels to make enquiries (complete)
- Reaffirm QCoal's position as a small, private Queensland mining company dedicated to responsible mining development and operations in the northern Bowen Basin (ongoing).

ENGAGEMENT MECHANISMS

A range of engagement strategies will be employed to continue the consultation process with stakeholders and the community throughout the life of the project. Two initial rounds of formal consultation were undertaken to inform the community about the project and gather input into the social sections of the project's environmental impact statement. Further rounds have been planned at this stage. Round 3 will advise the stakeholders and the community of the findings of the EIS following submission of the draft EIS. Round 4 will advise the stakeholders and the community of the changes made to the project design following receipt of all submissions and the provision of the final version of the EIS. Table below outlines the key stakeholder engagement mechanisms that are planned for use throughout the life of the project.

KEY STAKEHOLDER ENGAGEMENT MECHANISMS

Stakeholder Group	Primary interest in project	Engagement mechanisms
Federal Government	• Sustainable resource development • Road network changes/upgrades • EIS progress and conditions • Economic development of Australia	• Public media releases • Newsletters and information sheets • Project website
State Government	• Sustainable resource development • EIS compliance and conditions • Economic development of the State • Employment and training opportunities • Indigenous opportunities • Impact on housing affordability • Impact on service delivery • Impact on cultural heritage • Impact on local road networks	• Public media releases • Briefing sessions • Individual meetings • Newsletters and information sheets • Project website

Stakeholder Group	Primary interest in project	Engagement mechanisms
Local Government	• Impact on agricultural land • Opportunities for local businesses • Employment opportunities for local people • Impact on local road networks • Changes in the local demography and population profile • Regulation of accommodation village • Impact on rural lifestyles and livelihoods	• Public media releases • Briefing sessions • Individual meetings • Newsletters and information sheets • Project website • Glenden SEG
Traditional Owners	• Employment opportunities for indigenous people • Education and training opportunities for youth • Business and procurement opportunities • Impact on cultural heritage • Preservation of environmental values	• Meetings to action Cultural Heritage Management Plans • Group meetings • Letters, faxes and emails • Project website
Landholders	• Property acquisition and/or compensation arrangements • Environmental impacts on amenity • Protection of agricultural land • Impact on farming businesses • Economic opportunities • Land access	• Individual meetings • Newsletters and information sheets • Telephone calls • Letters, faxes and emails • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG
Resident Community	• Employment opportunities for local people • Business and procurement opportunities • Workforce behaviour in the community • Workforce integration with local activities • Cost and standard of living, particularly for non-mining residents • Access to community and health services • Housing availability and affordability • Community and social cohesion • Preservation of rural lifestyles and values	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG

Stakeholder Group	Primary interest in project	Engagement mechanisms
Emergency Services	• Increased fire risk • Availability of health facilities • Workforce behaviour in the community	• Individual meetings • Newsletters and information sheets • Letters, faxes and emails • Project website • Glenden SEG
Community and Environmental Groups	• Sustainable resource development • Preservation of environmental and social values • Workforce behaviour in the community • Workforce integration with local activities • Cost and standard of living, particularly for non-mining residents • Access to community and health services • Housing availability and affordability • Community and social cohesion • Local amenity	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG •
Education, Health and Community Services	• Access to educational, community and health services • Housing availability and affordability • Community and social cohesion • Local amenity	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG
Businesses and Business Groups	• Employment opportunities for local people • Business and procurement opportunities	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG

Stakeholder Group	Primary interest in project	Engagement mechanisms
Industry and Industry Groups	• Employment opportunities for local people • Business and procurement opportunities	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism • Glenden SEG
Special Interest Groups	• Sustainable resource development • Preservation of environmental and social values • Safety and wellbeing •	• Community information sessions • Newsletters and information sheets • Project website • Dispute Resolution Process and Grievance Mechanism
Utilities	• Business opportunities	• Community information sessions • Newsletters and information sheets • Project website • Glenden SEG
Media	• Business and narrative opportunities	• Community information sessions • Newsletters and information sheets • Project website

Table A2 Social impact significance assessment matrix

Magnitude of impact	Sensitivity of social value or receptor		
	High	Moderate	Low
High	Major	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Negligible

Table A3 Summary of potential social impacts—Byerwen Coal Project

Potential impact	Phase	Positive/ negative	Sensitivity	Magnitude	Significance
Demographics and demographic change					
Population growth associated with construction workforces	Construction	Negative	Low	Moderate	Low
Population growth associated with operation workforces	Operation	Negative	Moderate	Moderate	Moderate
Change to demographic characteristics of resident population of Glenden	Construction Operation	Negative	Low	Low	Negligible
History and heritage (non-Indigenous)					
Diminished rural and agricultural identity resulting from direct land use changes and development of a non-agricultural enterprise	Construction Operation	Negative	High	Low	Moderate
Indigenous community					
Increased employment, education and training opportunities	Construction Operation	Positive	Moderate	Moderate	Moderate
Increased business opportunities for Traditional Owners	Construction Operation	Positive	Moderate	Moderate	Moderate
Loss or destruction of items or areas of heritage value	Construction Operation	Negative	Moderate	Moderate	Moderate
Housing and accommodation					
Increased temporary accommodation requirements	Construction	Negative	Moderate	Moderate	Moderate

Potential impact	Phase	Positive/ negative	Sensitivity	Magnitude	Significance
Increased permanent accommodation requirements	Operation	Negative	High	Moderate	High
Residential amenity					
Amenity effects associated with increased traffic in residential areas	Construction Operation	Negative	Moderate	Moderate	Moderate
Changes to existing urban design of Glenden	Construction Operation	Negative	Moderate	Moderate	Moderate
Increased demand on existing municipal infrastructure	Construction Operation	Negative	Moderate	Moderate	Moderate
Employment, education and training					
Generation of construction employment	Construction	Positive	Moderate	Moderate	Moderate
Generation of operations employment	Operation	Positive	High	Moderate	High
Stimulation of training and skill development opportunities	Construction Operation	Positive	Moderate	Moderate	Moderate
Contribution to regional skills shortage	Construction Operation	Negative	Moderate	Moderate	Moderate
Local economic conditions					
Generation of opportunities for local businesses	Construction Operation	Positive	Moderate	Moderate	Moderate
Injection of wealth into local and regional economy	Construction Operation	Positive	High	Moderate	High
Difficulties attracting and retaining skilled staff	Construction Operation	Negative	Moderate	Moderate	Moderate
Increase to cost of living in local area	Construction Operation	Negative	Moderate	Moderate	Moderate
Health and safety					
Traffic-related incidents due to increased population	Construction Operation	Negative	Moderate	Moderate	Moderate
Social health effects associated with commuting and shift work.	Construction Operation	Negative	High	Low	Moderate

Potential impact	Phase	Positive/ negative	Sensitivity	Magnitude	Significance
Real or perceived deterioration of the safety of Glenden	Construction Operation	Negative	Moderate	Moderate	Moderate
Community infrastructure and social services					
Increased demand on health services	Construction Operation	Negative	High	Moderate	High
Increased demand on essential services	Construction Operation	Negative	Moderate	Moderate	Moderate
Increased demand on education services	Operation	Positive	High	Moderate	High
Increased demand on emergency services	Construction Operation	Negative	High	Moderate	High
Increased usage of recreational facilities and services	Operation	Positive	Moderate	Moderate	Moderate
Increased usage of general community infrastructure (halls, meeting spaces etc.)	Operation	Positive & Negative	Moderate	Moderate	Moderate
Lack of land allocation for provision of social and commercial services	Operation	Negative	Moderate	Moderate	Moderate
Social identity and cohesion					
Social identity of Glenden changed	Operation	Negative	Moderate	Moderate	Moderate
Reinvigoration of the Gleneden community	Operation	Positive	Moderate	Moderate	Moderate
Social friction resulting from creation of an ‘us and them’ dynamic	Operation	Negative	Moderate	Moderate	Moderate

Appendix 5. Response to the Independent Scientific Expert Committee advice

In section 8.6 of my report I considered the key aspects of the Independent Expert Scientific Committee's (IESC) advice. Below is my response to matters raised in the IESC advice.

IESC Advice and Coordinator-General's Response

IESC comment – Flooding

There is potential for flood events to impact on the water quality of the Suttor River system, by dispersing and scouring of material associated with waste rock dumps. A modelled 1000 year average reoccurrence interval (ARI) flood event scenario has been predicted to reach waste rock dumps associated with South Pit 1 and South Pit 2, indicating depths of up to 2 m and velocities in the order of 1 m/s adjacent to the waste rock. It is recommended that:

i. Design and risk assessments of the proposed waste rock dumps be undertaken to mitigate any potential impacts from flood events; and

ii. The proponent relocate waste rock dumps beyond the extent of the 1 in 1000 ARI flood event if appropriate measures cannot be put in place to adequately reduce risks.

Flood modelling in the Kangaroo Creek catchment is needed to increase confidence in the design for water related infrastructure. The modelling provided by the proponent does not include the Rosella Creek sub-catchment within the Kangaroo Creek catchment, which incorporates the North Pit and its proposed diversion.

Impact of flooding on waste rock dumps and the Suttor River

As per section 16.7.1 of the environmental impact statement (EIS), to mitigate potential flood impacts on the waste rock dumps, armouring will be put in place up to the 1000 year ARI flood level such that it is non-erodible when in contact with flood waters. Further, the placement of waste rock will be closely supervised to ensure no unnecessary clearing occurs and water and sediment are managed to avoid water quality impacts to the Suttor River (Appendix 6, Commitment 171). As the waste rock dump will be armoured and waste rock placement monitored, I have not required the proponent to move the footprint of the dump.

Kangaroo Creek catchment flood modelling

Flooding was addressed in Chapter 16 of the EIS. Site specific flood modelling for Kangaroo Creek, which is located in the northern phase of the project was not undertaken for the EIS by the proponent because the north pit and associated waste rock dump are above the floodplain. The small gullies in these areas are also not of sufficient size to warrant flood modelling. The proponent used the Queensland Interim Floodplain Assessment Overlay to indicate that other than the linear infrastructure

crossing the creek, no mine infrastructure is proposed in the Kangaroo Creek floodplain (refer Figure 16-1 in Chapter 16 of the EIS).

I consider that flood modelling for the Kangaroo Creek is not warranted. Infrastructure for the northern phase is not required until approximately year 15 of the mine life. I acknowledge that detailed design will be undertaken by the proponent closer to that time. I required the proponent to prepare localised water management measures during detail design for the northern phase.

IESC comment – Site water balance model

The project assessment documentation should include an updated site water balance model to provide greater certainty about the potential impacts from the project on the receiving environment. The model should incorporate all water inputs, stores and outputs of the mine water management system, with results showing the response to seasonal and long term climate variation, extreme weather events and water requirements over various stages of mine development and also include:

i. The total water demand for the mine water operation rather than a net demand;

ii. The operation of clean water dams for the purpose of facilitating either diversions or release of water from the mine pits;

iii. Confirmation that, under all scenarios, any river discharges will be made in accordance with proposed dilution rates for low, medium and high flows to prevent water quality (particularly salinity) impacts;

iv. Sediment affected water from the drainage of disturbed area such as mining infrastructure areas for release or site use; and

v. Other internal water movements, such as the on-site re-use of water from mine pits, the coal handling and processing plant and co-disposal process.

Chapter 8 - Water Management and Appendix 11 - Mine Water Management Strategy of the EIS presented information about the site water balance model. Impacts associated with the operation of the water management system, and measures to mitigate those impacts were outlined in Chapter 15 Surface Water, Chapter 16 Hydrology and Hydraulics, Chapter 19 Aquatic Ecology.

The proponent advised that the water balance model developed for the project is based on industry standard hydrological and hydro-chemical modelling and the methodology is considered appropriate and well suited for mine planning and impact assessment.

Appendix 11 to the EIS describes the site water balance model and contains the information requested by the IESC. Further supporting information can be found in the environmental management plan (EM Plan) (Version 4 May 2014). In response to the IESC's concerns:

- Sections 5.1 and 5.2 of Appendix 11 of the EIS include information about the use of the 123 year 'Datadrill' climate record database (developed through observations made by the Bureau of Meteorology) for the Project. The model includes seasonal and long term climate variation and potential for extreme events.
- Water requirements over various stages of mine development have been considered and are shown on catchment and drainage plans shown in the figure attachments in Appendix 11 to the EIS.
- Water demand for the mine water operation is described in section 3.1 of Appendix 11 and the proponent confirmed the model includes total water demands. Total water demands can be seen at Table 3-1 in the EM Plan.
- The operation of clean water dams is included in the model as described at section 5.1 of Appendix 11.
- River discharges, or mine water releases were discussed in section 4 of Appendix 11, including dilution to meet water quality objectives (WQOs). Furthermore, I have stated a range of conditions in Appendix 2, Schedule Fof my report regarding mine water releases, including release limits and WQOs.
- With respect to the recommended inclusion in the model of sediment affected water from the drainage of disturbed areas such as mining infrastructure areas for release or site use, the proponent provided further information to me that explained why this water is not included or required to be included in the model. This type of water is not included in the model because:
    - it is not considered "mine affected water" and is therefore not administered through the environmental authority (EA) as per DEHP's advice.
    - once sediment has been removed from the water (via a sediment dam), the water may be released to the environment. The releases will occur in accordance the proponent's erosion and sediment control plan required by the EA.
    - The water is not available for reuse (as it is released to the environment) and does not contribute to the fulfilment of site water demands.
- Other internal water movements, such as the on-site re-use of water from mine pits, the coal handling and processing plant and co-disposal process is included in the model as the re-use water will predominantly be used for dust suppression. Section 5.1 and Table 5.1 of Appendix 11 to the EIS highlight the use of mine water for dust suppression in the model.

I consider the site water balance model provided as part of the EIS, along with additional information to the EIS provided by the proponent, sufficient to assist in my assessment of the potential impacts of the project. By complying with the water related conditions I have stated at Appendix 2, Schedule F, the project is not expected to have unacceptable impacts upon the receiving environment.

IESC comment – Voids management

Potential impacts may result from the four final voids that will be created covering a total area of 1342 ha with depths up to 350 m. The Committee considers that:

a. Voids are a long-term environmental legacy and that backfilling of voids and pit lakes represents best environmental practice.

b. The inadequacies with the site water balance (see IESC comment above) and groundwater modelling (see paragraph 2) lead to uncertainty regarding the final water level in the voids and a wide range of predicted salinity values. Based on the information presented, the Committee has a low level of confidence in the final void modelling results.

c. Further assessment should be undertaken to identify and quantify the potential impacts of void water discharge to groundwater and surface water systems, particularly with respect to salinity. Relevant mitigation and management measures should be identified to address these impacts.

d. Groundwater and surface water monitoring should extend well beyond the project life to the point of hydrologic and hydro-chemical equilibrium to ensure that any impacts from the potential discharge of void water are detected and mitigation measures applied.

In relation to cumulative impacts, the regional extraction of large quantities of coal and overburden will create a regional scale linear void and result in de-stressing and redistribution of crustal loading along the eastern edge of the Bowen Basin. Consequent seismicity and spatial changes in the relationships of stratigraphic units and/or topography have the potential to change aquifer interconnectivity and surface water flows. The consequence of establishing a deep linear void trending parallel to many subsurface structural lineaments, including faults, would benefit from further scientific investigation.

In response to my request to the proponent for additional information about the final voids, a final void technical report was provided as Appendix 9 to the AEIS.

In-filling of final voids

The in-filling of voids is not a statutory requirement in Queensland where environmental management of final voids is effected by way of a final void management plan. I note the option of backfilling completely with progressive in-pit dumping of waste rock will be undertaken by the proponent for four of the eight voids. The remaining four voids will be progressively partially backfilled and rehabilitated during the mine life as the complete backfilling would require transporting of out-of-pit rehabilitated waste rock dumps to the voids. Backfilling all voids will also require additional earthworks to backfill the last open pit after the saleable coal product has been removed. While it is technically possible to backfill, it is not considered viable by the proponent.

On the question of environmental best practice, I am advised that backfilling of allthe voids would result in known potential environmental impacts remaining un-mitigated for the life of the mine. This is due to the inability to progressively rehabilitate waste rock

dumps during the life of the mine causing increased erosion, dust generation and weed infestation.

I have stated a condition in Appendix 2, Schedule H of this report for all reasonable and practical measures to be taken by the proponent to minimise the size of the voids remaining after mining activities cease. This condition will reduce the area of pit lake voids where possible.

Further, in accordance with standard management provisions for mining in Queensland, I have stated a condition for the management of residual voids. The proponent must ensure that residual voids do not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer. I expect this conditioned outcome to be addressed during operation and post mine closure through the mine closure plan and the post closure management plan to be prepared by the proponent, as per its EM Plan.

Section 9.5.2.1 of the EM Plan (14 May 2014) sets out the components of the final void investigation to be prepared by the proponent and reviewed every five years to study the options available for minimising final void area and volume and the proposal for end of mine void final use.

Final void water level and salinity values

From the modelling undertaken and described in Section 4.2 of Appendix 9 to the AEIS there is a 5 to 15 per cent chance that if higher than expected groundwater inflows occur, or anthropogenic climate change results in higher rainfall and lower evaporation, then one or more pit lakes may eventually stabilise above the regional groundwater table. Discharges to the groundwater system could occur under these conditions, as pit water will have a flow mechanism into the surrounding geology, however the modelling suggests there is a very low probability of this occurring.

Salinity of final void water is expected to increase and range between 1000 mg/L and 10 000 mg/L over time. Waste rock geochemistry testing suggests that there is a low risk of acid generation, and the water quality entering the voids from the pit walls would not adversely affect void water quality. The salinity of near surface pit water is expected to be much lower that at depth, with high dissolved oxygen, neutral to slightly alkalinity, with low to very low dissolved metal concentrations.

Potential final void water discharge

Final void water will flow into the surrounding groundwater if it stabilises above the surrounding groundwater level. The EIS concluded that there is a 15 per cent probability for the base case and high emission climate change scenarios and a 5 per cent probability in the high hydraulic conductivity scenario that the East Pit final void water level will exceed the regional groundwater level allowing movement of void water into the surrounding regional groundwater. The proponent noted that existing groundwater is generally brackish to saline and of poor quality; therefore the potential for final void water to impact on the surrounding groundwater is expected to be minor. My condition requiring that the residual voids do not cause any serious environmental harm will help to mitigate any impact on groundwater.

Flood modelling undertaken by the proponent showed that under a 1000 year Probable Maximum Flood (PMF) event the mine pits will not be affected by floodwaters from the Suttor River. The PMF event reaches the south-western corner of South Pit 1 however the final void in South Pit 1 will not be affected by the PMF flood event. The proponent will construct drainage diversions to mitigate against flooding of the other open pits and final voids from drainage lines and water courses that intersect the proposed open pits. The pit voids will also be protected from ingress of overland flow that may otherwise result in overtopping of the voids during the mine life or after mine closure.

Given the modelled final void levels outlined above and that flooding will not affect the voids, it is highly unlikely that void water will be discharged to the surrounding environment via overtopping. The EIS concludes that there is no circumstance where water from within the void will rise to the final void rim and therefore discharges to the surface water system should not occur.

Groundwater and surface water monitoring

The EIS water level predictions and water balance were derived using a model that includes contaminant modelling to track salt movement and accumulation over a time scale of 500 years (refer Chapter 11 and Appendix 13 of the EIS). The proponent considered this was a sufficient period to achieve hydrologic equilibrium and extension of the modelled timeframe beyond 500 years was considered but rejected, since it would not provide any greater understanding of the evolution processes.

I acknowledge that the modelling results contain some uncertainty regarding the final water level and predicted salinity values in the voids post mine closure. I expect the groundwater and surface water monitoring to extend beyond the project's 50-year life towards the point of hydrologic and hydrochemical equilibrium to ensure that any impacts from the potential discharge of void water are detected and appropriate mitigation measures can be applied post mine closure.

Section 9.5.2.1 of the EM Plan (14 May 2014) sets out the proponent actions to undertake a residual void water quality management study to model and assess the predicted quality of void water between cessation of mining and the post mining equilibrium. The results of this monitoring are to be provided to the relevant State government environmental authority at the time of equilibrium to provide sufficient evidence of equilibrium, should complete backfilling of all eight voids not occur. I acknowledge the proponent's commitment in section 9.8.4 of the EM Plan (14 May 2014) to prepare a post closure management plan for the project site to be implemented for a period of 30 years following final coal processing on site, or a shorter period if the specified criteria are met.

Cumulative impacts of multiple voids across the Bowen Basin region

I consider there is a need to understand the best environmental, economic and social outcomes with regards to mine pit management and the long-term implications of creating pit lakes/voids in the Bowen Basin. I consider it is appropriate for the state government to undertake investigations into the consequences of establishing a deep linear void trending parallel to many subsurface structural lineaments, including faults, across the entire Bowen Basin. Initially the research should determine the current location, number, area and depth of both operational mine pits and residual voids post

mine closure as this information is not currently available for analysis. Geological Survey advises that this information would be contained within the current plans and reports lodged with the inspectorate and Geological Survey Queensland. Once analysed an approach to pit management and backfilling of future mine proposals could then be developed based on the known combined voids in the Bowen Basin and their economic impact on land use.

IESC comment – Creek diversions

The proposed stream diversions will not have a significant impact on a regional scale, however they have the potential to change to catchment hydrology, geomorphology and ecological integrity at a local scale. The Committee considers that the management measures proposed by the proponent for stream diversions should adequately address potential impacts and emphasis should be placed on monitoring of the diversion network due to the high potential for dispersion caused by sodic soils.

Following my request for additional information the proponent's AEIS included a hydrologic and hydraulic analysis and a progressed diversion concept design. The proponent has committed to design the diversion channels as stable systems that will be maintained over the life of the mine, with refinements made if needed, resulting in diversions that are self-sustaining and stable. I have stated conditions requiring the preparation of a receiving environment monitoring program (REMP) to monitor, identify and describe any adverse impacts to surface water values, quality and flows and to report annually on the findings.

IESC comment – Water quality objectives

The Committee has concerns regarding the determination of local WQOs, specifically the selection of sampling sites for the compliance and discharge points on the Upper Suttor River. The selected sampling site FSS07 on Suttor Creek, supplemented by site BYSW6 located on a tributary within the southern area of the project boundary, may not accurately represent the environmental condition of the Upper Suttor River catchment. Further assessments and sampling are needed to strengthen baseline data for the Upper Suttor River WQOs.

In response to my request for additional information to support the proposed WQOs, the proponent prepared a revised existing surface water environmental values report as Appendix 5 to the AEIS. The report revised a number of the WQOs. Further review and discussion between DEHP, my office and the proponent was undertaken following the AEIS to ensure appropriate WQOs and additional sampling sites were chosen for the project. The comprehensive range of conditions relating to WQOs, release and monitoring criteria and requirements presented in my stated conditions in Appendix 2, Schedule F of this report result from these discussions. I am satisfied that my requirement for further assessment of baseline data, the additional sampling site foe compliance monitoring and the final WQOs I have conditioned for the project will appropriately mitigate potential impacts on the receiving environment.

IESC comment – Palustrine wetland

The proposed project has the potential to reduce the catchment area of the palustrine wetland by approximately 43 per cent. It is likely that within the proposed 16 year timeframe of impact, a significant change to the wetland will occur, potentially resulting in reduced ecological diversity. The proponent has not sufficiently addressed all associated risks to the palustrine wetland. Due to its high ecological significance, an appropriate management strategy is needed to protect and conserve the wetland.

Adequate baseline groundwater quality and quantity data has not been provided including information about shallow hydrostratigraphic units particularly in relation to the role of groundwater in wetland hydrology.

Wetland management

In response my concern that the proponent had not proposed monitoring, mitigation measures or rehabilitation strategies for the project's impact on the wetland, the AEIS (Appendix 7, the Wetland Memo) included information and commitments (Appendix 6, commitments 403 and 404) related to monitoring changes to the wetland and mitigation measures to reduce long term impact on the wetland.

Water level monitoring will be undertaken in the wetland and monitoring of wetland ecology will be undertaken as part of the receiving environment monitoring program (REMP) so that potential changes in species abundance in the wetland can be monitored. Ongoing monitoring during and post mining activities in the specific wetland catchment area will assess retention of wetland ecosystem functionality.

The remediation strategy for the wetland catchment set out in the proponent's EM Plan involves returning the land to a similar hydrological profile thereby creating a similar catchment for the wetland. The proponent's AEIS states that no direct rehabilitation of the wetland is proposed as it is expected the wetland will return to natural hydrological conditions after the hydrological profile has been returned to its pre-development state, which is expected to occur approximately 16 years after the waste rock dump is first established. I have stated a condition requiring the REMP to be designed to ensure the ecosystem functionality of the wetland can be demonstrated to have returned close to (or better than) pre-development conditions.

The role of groundwater in wetland hydrology

In addition to the IESC, other submitters on the EIS raised concerns that data had not been provided to ascertain whether or not the wetland is also groundwater fed. If groundwater does have a role in wetland hydrology, project activities that impact on groundwater may cause further reduction of wetland area and ecology.

In response, the proponent has installed a shallow borehole adjacent to the wetland to provide additional geological baseline data in relation to the hydrology of the wetland.

I have also stated conditions in Appendix 2 relating to groundwater monitoring, reporting and compliance in the event of groundwater fluctuations.

IESC comment – Removal of permanent water sources

The proponent intends to remove artificial wetlands (dams) with a combined size of 5.8 ha. These are permanent water sources that support a large array of wildlife. The removal of the dams within the project area has the potential to reduce diversity within the region, as they are currently the only sources of permanent water within the southern part of the project area and are a resource for wetland birds and EPBC Act listed migratory birds.

EIS Chapters 18 and 35 examined potential impacts to wetland birds and migratory species that are known or likely to occur within the project area. The removal or degradation of ephemeral water bodies is likely to have the largest effect on the Eastern great egret, Latham's snipe and the Australian painted snipe EPBC listed migratory species as these water bodies provide foraging habitat for these species.

Impacts to these species were predicted to be minor or negligible as the species are highly mobile and capable of relocating with changes in the availability of suitable wetland habitat.. The riparian areas along the Suttor River are located outside the development footprint and will experience little disturbance. Therefore migratory birds will still have access to these areas. Impacts will be further mitigated through the benefits for the species to be provided by the permanently protected area of Brigalow and SEVT to be provided as a land based offset against residual impacts of clearance of existing regional ecosystems.

There is also the potential for the project to impact on the EPBC Act list species the Rainbow bee-eater, as the banks of water bodies in the project area provide high quality nesting habitat. The proponent committed to time works in a waterbody or watercourse to avoid breeding season (September-February) and to use fauna spotter-catchers to search for birds and nests before clearing or work on a waterbody or watercourse. Additionally, large areas of suitable habitat will not be disturbed by project activities and will remain available for these species.

I have recommended a condition related to threatened species under the NC Act that requires the proponent to develop impact mitigation and management measures to maximise the ongoing protection and long-term conservation of threatened species known or likely to occur in the project area. I have also recommended a condition for a land based biodiversity offset for residual impacts to ecological communities listed uner the EPBC Act.

IESC comment – water related risk assessment

The project assessment documentation needs the addition of a stand-alone risk assessment considering water-related risks to the environment. This risk assessment should be informed by further studies and assessments recommended by the Committee and should:

a) Identify regional water related assets that may be vulnerable as a result of the proposed project;

b) Identify potential impacts on those assets, including cumulative impacts;

c) Quantitatively assess the likelihood and consequence of identified impacts;

d) Determine the overall level of risk to assets; and

e) Assess the residual risk following application of proposed mitigation measures.

EIS Chapter 15 (Section 15.7) and EIS Chapter 16 (Section 16.7) reviewed the risks and potential impacts from proposed works on surface water.

In response to my request for additional information relating to potential surface water impacts and WQOs for mine water releases, the proponent provided a revised assessment of surface water environmental values (see Appendix 5 of the AEIS) and a revised mine water releases report (see Appendix 4 of the AEIS).

Regional water related assets, potential impacts (risks) and mitigation measures are described in Section 2 and Section 3 of the revised surface water environmental values report. By complying with the proposed WQOs for mine water release, the revised reports predict that the project would not have any unacceptable impacts upon the water quality or water related assets.

The WQOs are used as the basis for developing mine water release criteria and the approach to management of water quality within the sub-catchment areas. The WQOs, release and monitoring criteria presented in my stated conditions in Appendix 2, Schedule F of this report result from a comprehensive review and negotiation period with DEHP, my office and the proponent.

Where there is limited data available for cumulative and project related impacts to water resources, I have stated conditions requiring further monitoring (Appendix 2 of this report) to ensure impacts can be suitably assessed.

I consider the revised assessment of surface water environmental values and mine water releases report contain sufficient information to determine and assess the water related risks of the project.

Appendix 6. Proponent commitments

This appendix includes commitments made by the proponent. Table A4 provides the commitments from the EIS. Table A5 provides the commitments from the AEIS. The relevant section of the EIS or AEIS section is included in the tables for reference.

Table A4 Commitments made in the environmental impact statement

#	Proponent commitment	EIS reference
1	A water management system will be established to manage site stormwater flows, control run-off, prevent erosion, divert clean water and capture and manage mine area runoff and pit water.	Chapter 1, section 1.6.1.
2	Water within the project area will be segregated based on quality to maximise opportunities for water re-use, minimise the mine water inventory and minimise changes to the hydrological regime (e.g. by allowing clean water to pass around the disturbed areas).	Chapter 1, section 1.6.18.2.
3	Supernatant or decant water from the co-disposal facilities will be recycled to the process plants for coal washing. There will be no controlled releases from the process water system.	Chapter 1, section 1.6.1.1; Chapter 7, section 7.6.1; Chapter 8, sections 8.2 and 8.3.
4	The CHPP areas will be designed to capture all runoff from disturbance areas surrounding the CHPP in environmental control ponds and sediment dams.	Chapter 7, section 7.6.
5	Construction of levees and drainage diversions will also be required to ensure pit workings and mine infrastructure are protected from surface runoff. Mine affected water will be contained in dams for periods of time until there is sufficient dilution to allow release to the environment and still achieve water quality objectives.	Chapter 1, section 1.6.1.2; Chapter 8, section 8.2.1.
6	Heavy vehicle and light vehicle washdown facilities will be provided on the MIAs. All water and drainage from washdown facilities will discharge into a grit trap then an oil/water separator.	Chapter 1, section 1.6.5.
7	Byerwen Coal will transport the majority of workers from the accommodation village in Glenden to the mine site by bus, with some transport movements in light vehicles.	Chapter 2, section 2.2.15.
8	The proponent will continue to assess telecommunications options to provide safe and reliable communications for the project.	Chapter 2, section 2.2.21.
9	The proponent will implement the Environmental Management Plan (EM Plan) as approved by the administering authority.	Chapter 3, section 3.1
10	The reagents required to operate the flotation cell (diesel and Methyl Isobutyl Carbinol (MIBC)) will be provided and stored in a purpose built fuel farm. The fuel farm will consist of one storage tank for each of the reagents located in a fully bunded area.	Chapter 7, section 7.6.1.
11	Co-disposal dams will be designed by a Registered Professional Engineer of Queensland (RPEQ) and will involve site specific geotechnical and hydraulic investigations.	Chapter 7, section 7.7.7.
12	Co-disposal dam design will be based on a turkey‘s nest configuration with no external catchment reporting to the cells within the dams.	Chapter 7, section 7.7.7.
13	The co-disposal dams may be referrable dams and will comply with all relevant regulations, codes and guidelines for referable dams.	Chapter 7, section 7.7.7.

#	Proponent commitment	EIS reference
14	Product coal stockpiles will be bunded to prevent ingress of clean stormwater. Stormwater from the product stockpile will be directed to an environmental control pond.	Chapter 7, section 7.8.
15	The fuel facility will comprise a number of interconnected self bunded bulk diesel storage tanks. The fuel facility will be located at a safe operating distance from other MIA and surrounding facilities in accordance with Australian Standard AS1940 - The storage and handling of flammable and combustible liquids.	Chapter 1, section 1.6.4; Chapter 6, section 6.5.1, Chapter 7, sections 7.9.3 and 7.18.2; Chapter 18, section 18.3.1; Chapter 26, section 26.5.
16	The lube and oil facility will include self bunded lube and oil storage tanks for a number of different types of oil and lube.	Chapter 1, section 1.6.4; Chapter 7, section 7.9.4.
17	Hydrocarbon and other contaminated waste will be collected, transported by a licensed waste transporter and disposed of an appropriately licensed waste disposal facility.	Chapter 1, section 1.6.4; Chapter 7, sections 7.9.4 and 7.18.2; Chapter 26, sections 26.3.3 and 26.4.4.4.
18	An explosives magazine to house detonating explosives, bulk storage and all associated materials will be designed and constructed to Australian Standard (AS) 2187 Explosives — Storage, Transport and Use, and any other applicable standards and industry best practice. The magazine will be located in an isolated area for safety and security purposes.	Chapter 7, section 7.9.7.
19	Where required, crossings of the infrastructure corridors will be provided to allow landholders access from one side of the property to the other for the movement of stock and vehicles. The design and location of crossings will be determined in conjunction with landholders.	Chapter 7, section 7.11; Chapter 14, section 14.6.1.2.
20	Haul road crossings of watercourses and drainage lines will be designed to minimise impacts and may include culverts and bridges.	Chapter 7, section 7.11.1.
21	Approvals will be sought for all works associated with temporary road and stock route closures and relocations. All road and stock route closures or relocations will be communicated to the public.	Chapter 3, section 3.4.21; Chapter 7, section 7.11.4.
22	The proponent will consider whether any vegetation clearance has potential as commercial native timber (e.g. fencing type timber) and may allow for salvage of timber to occur prior to clearance for mining activities.	Chapter 7, section 7.12.
23	Wastes will be effectively managed and reduced through the implementation of site specific recycling practices and licensed collection for waste oils, batteries, tyres etc. No landfill disposal will occur on-site, although used tyres may be disposed of in-pit.	Chapter 1, section 1.6.4; Chapter 7, sections 7.9.4 and 7.18.2; Chapter 26, sections 26.3.3 and 26.4.4.4.
24	Treated effluent will be re-used, most likely for irrigation, with sludge/biosolid disposed of by a certified third party contractor at an appropriately licensed regional waste disposal facility.	Chapter 1, section 1.4; Chapter 7, section 7.18.3; Chapter 26, sections 26.3.3, 26.4.6 and 26.5.

#	Proponent commitment	EIS reference
25	The sewerage treatment plant (STP) will be designed to treat effluent to a class suitable for irrigation to land so that there are no long term detrimental impacts to soils or watercourses. Sufficient storage will be provided in bunded tanks to hold treated effluent during periods of wet weather.	Chapter 7, section 7.18.3; Chapter 26, sections 26.5, 26.4.3 and 26.4.6.
26	Rehabilitation of the mine will be progressive throughout the operation and decommissioning of the mine, and considers many elements addressed throughout the EIS, including but not limited to, mine scheduling, waste rock and soils management, water management and terrestrial and aquatic ecology.	Chapter 1, section 1.6.6; Chapter 7, section 7.19; Chapter 10, section 10.4; Chapter 26, section 26.4.6.
27	The proponent will prepare a Pest Management Plan to manage pests and weeds identified in field assessment undertaken within the project areas, during both the construction and operation phases of the project.	Chapter 3, section 3.4.21.
28	The proponent will seek approval from DTMR prior to the transport of over-mass or over-dimension loads taking place.	Chapter 3, section 3.4.37.
29	The project will comply with all relevant standards, codes and guidelines available to monitor and control construction and operations on site, including Australian Standards, industry codes of best practice and Australia and New Zealand Guidelines for Fresh and Marine Water Quality.	Chapter 3, section 3.6.10.
30	Where inland aquatic ecosystems are likely to be disturbed by the project the proponent will undertake an investigation and describe the management (if present) of acid sulfate soils in accordance with the guidance document.	Chapter 3, section 3.6.11.4.
31	The proponent will advise the community of the EA and ML application process via: community newsletter to stakeholders; meeting with statutory stakeholders, where required; community displays and ongoing community meetings.	Chapter 4, sections 4.2.2 and 4.4.3.3.
32	The proponent will conduct ongoing stakeholder engagement and consultation with the community of Glenden throughout Phase 3 (construction) and 4 (during operations) of the project.	Chapter 4, sections 4.4.4, 4.4.3.4, 4.8 and 4.10; Chapter 31, section 31.7.2.
33	A key component of the proponent's consultation strategy is its collaborative approach to impact management. This will be achieved through participation in the Glenden Stakeholder Engagement Group (SEG). The proponent will participate in the regular meetings with the intention of keeping the community up to date with the progress of the project.	Chapter 4, section 4.5.5; Chapter 31, section 31.5.5.2.
34	Stakeholders and the community will be consulted during the preparation of the EIS supplementary report; this will comprise the fourth round of consultation.	Chapter 4, section 4.8.
35	During the construction, operations and decommissioning stages of the project, the community will continue to be informed of project activities via project newsletters and responses to concerns and complaints registered via the proponent's grievance/feedback mechanism and dispute resolution process.	Chapter 4, section 4.8.
36	Following the completion of the EIS process, community consultation and stakeholder engagement will be ongoing through the implementation and adaptive management of the SIMP.	Chapter 4, sections 4.8 and 4.10.

#	Proponent commitment	EIS reference
37	The Dispute Resolution Process will be communicated as part of the stakeholder engagement and community consultation process once the project is approved to proceed.	Chapter 4, section 4.9.2.
38	Removal, relocation or demolition will include the removal of existing standing structures, subject to an agreement with landholders for conduct and compensation in accordance with the granting of the mining lease for the project.	Chapter 6, section 6.4.1.
39	Site clearance will be staged throughout the construction phases on an as-needed basis to coincide with structure installation and erection to minimise the extent and duration of cleared areas at any time.	Chapter 6, section 6.4.1.
40	Suitable soil resources for use in rehabilitation will be stripped from areas where construction and mining operations will occur.	Chapter 6, section 6.4.1.
41	Upgrades to the intersection of the Collinsville-Elphinstone Road and the site access road will be determined through consultation with the relevant road authority.	Chapter 6, section 6.4.1.
42	Installation of permanent drainage will be undertaken to accommodate both the construction and operational phase drainage where possible. Where permanent drainage for the operational phase cannot be installed, temporary drainage for the construction period will be designed to the appropriate standards.	Chapter 6, section 6.5.3.
43	An environmental control pond will be established at the north and south MIAs to capture runoff from construction of the MIA, CHPP, ROM pad, product coal pad and associated infrastructure.	Chapter 6, section 6.5.3; Chapter 7, section 7.9.
44	Alternative access routes and arrangements will be made for any temporary closures or relocations of public roads and stock routes.	Chapter 6, section 6.5.3.
45	The central infrastructure corridor crossing of Kangaroo Creek and crossings of other ephemeral drainage lines, including the crossing of the diversion channel between West Pit 1 and South Pit 1, will be designed and constructed to provide sufficient flood immunity for a 1 in 100 year flood event. The watercourse crossing will be designed to limit works within the watercourse itself.	Chapter 6, section 6.5.9.
46	All potable water will be procured, transported, treated monitored and stored in compliance with the Australian Drinking Water Guideline 2004[1].	Chapter 6, section 6.5.10; Chapter 8, section 8.3.1.
47	Following installation the water supply pipeline corridor will be progressively rehabilitated, allowing for maintenance access and limitation of deep rooted vegetation in proximity to the pipeline.	Chapter 6, section 6.5.11.

#	Proponent commitment	EIS reference
48	Dams will be constructed in accordance with the design requirements as determined by assessment of the dams in accordance with the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (DERM 2012) (the Manual). The hazard category of any dam will be assessed by a suitably qualified and experienced person in accordance with the Manual. All regulated dams will be designed and constructed under the supervision of a suitably qualified and experienced person in accordance with the requirements of the Manual. Regulated dams will be designed and constructed in accordance with the Manual and with floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life and any period of decommissioning and rehabilitation. Dams will be constructed, operated and maintained in accordance with accepted engineering standards (e.g. Australian National Committee on Large Dams guidelines and Australian Standards).	Chapter 6, sections 6.5.3 and 6.5.12; Chapter 8, section 8.6.4.1; Chapter 9, section 9.7; Chapter 17, section 17.5.6.
49	During construction, the following stormwater management practices will generally be used: sediment and erosion controls will be installed around construction areas, clean water will be diverted from disturbed areas and sediment dams will retain and settle dirty water with a sediment load, before releasing any water. Sediment dams will be constructed in accordance with the design requirements as determined by assessment of the hazard category of dams in accordance with the Manual. Sediment dam design will also be undertaken in consideration of DERM guidelines and the 'Best Practice Erosion and Sediment Control Guideline' from the International Erosion Control Association Australasia (IECA). Construction activities in or near watercourses will be conducted in accordance with established guidelines.	Chapter 6, section 6.5.13.
50	Specialist handling of hazardous materials will be undertaken during transport of these materials in accordance with applicable legislation. Tanks and drums of potentially polluting or otherwise hazardous materials will be stored in secure containers or compounds which are locked when not in use. Secure valves will be provided on oil and fuel storage facilities. Equipment and vehicles will be locked, have keys removed and be stored in secure compounds.	Chapter 6, section 6.7.2.
51	In the initial stages of construction, all sewage will be transferred by truck by a company licensed to transfer regulated waste to an appropriate waste disposal facility until STP is installed. Effluent from the STP will be treated to a standard which will allow re-use on site and will be pumped to a holding dam or tanks prior to use. The storage capacity of effluent holding areas will be determined during detailed engineering. Biosolids will be disposed of by a certified third party contractor at an appropriately licensed regional waste disposal facility.	Chapter 6, sections 6.6.4 and 6.8; Chapter 26, sections 26.4.6 and 26.5.
52	An Emergency Management Plan will address all foreseeable site specific risks, such as fire, flood, and accidents, including appropriate contact details of emergency services agencies. Designated construction personnel will have appropriate environmental spill response training and the contact details of relevant responsible persons, should a significant spillage of oils or chemicals occur. Construction works within MIAs will have 24 hour security coverage. A manned security gate will be established at the entrance to the site. All personnel entering the site and the construction village will have to pass through the security gate.	Chapter 6, section 6.9.

#	Proponent commitment	EIS reference
53	Runoff from the MIA, CHPPs, coal stockpiles and other infrastructure areas, that is potentially contaminated (e.g. with oils), will be directed to other structures designed to improve the quality of the water such as an oily water separator or environmental control dam. It will then be released into the mine water system as mine affected water or sediment affected water, depending on water quality. Water that accumulates in pits as a result of groundwater inflow and surface water runoff will be collected in sumps and pumped to mine affected water dams at the surface.	Chapter 1, section 1.6.5; Chapter 7, section 7.9.5; Chapter 8, section 8.2; Chapter 19, section 19.6.6.2; Chapter 26, section 26.5.1.
54	In most cases runoff from undisturbed catchments upstream of the mining area would be diverted around the disturbed area and released directly to the environment. Where this is not the case a clean water dam is proposed either to facilitate the diversion, or to provide a source of clean water that can be used to blend with mine affected water (if required) to facilitate release.	Chapter 1, section 1.6.1.4; Chapter 8, section 8.2.3; Chapter 15, section 15.7.4.1; Chapter 19, section 19.6.2.2.
55	Sediment affected water would pass through sediment dams prior to release to the environment.	Chapter 1, section 1.6.1.3; Chapter 8, section 8.2.2; Chapter 15, section 15.7.4.3; Chapter 19, sections 19.6.2.2 and 19.6.6.2.
56	Process water will be imported to site from an external supply source (SunWater's Burdekin to Moranbah pipeline) and re-used.	Chapter 8, section 8.3.
57	A combined fire, washdown and dust suppression reticulation system will be provided around the CHPPs, and will also service the site office and workshop facilities. Dust suppression sprays will be provided around the CHPP area, and will also service the CHPP site offices and workshops.	Chapter 8, section 8.3.
58	It will be necessary for the project to release water to the environment to balance the mine water inventory. This will be achieved through a controlled release strategy that allows discharge into the environment when water quality and flow conditions are within acceptable limits.	Chapter 8, sections 8.5 and 8.7; Chapter 15, section 15.7.5.
59	Discharge of mine affected water to the environment will be undertaken on the basis of: • End-of-pipe water quality: This controls the water quality that enters the environment. A range of water quality indicators will be used to ensure the water quality is suitable for release. The salinity limits (measured as electrical conductivity) vary based on the flow in the receiving waterway; • Flow in the receiving environment, measured upstream of the mine site releases: Discharges will only be permitted during or immediately following flow in the receiving environment. • Receiving waterway (downstream) water quality: This controls the water quality in the receiving environment at a downstream location, below a mixing zone. This provides an opportunity to utilise dilution in the receiving waterway, while ensuring that the water quality in the receiving waterway is maintained within a range experienced in the natural environment.	Chapter 8, section 8.5; Chapter 13, section 13.6.5.2; Chapter 15, section 15.7.5; Chapter 18, section 18.4.3; Chapter 19, section 19.6.2.1.
60	Mine affected water quality parameters will be measured during operations.	Chapter 8, section 8.5.

#	Proponent commitment	EIS reference
61	A Failure Impact Assessment will be completed by the proponent, if required, when detailed designs of the southern co-disposal dam are available.	Chapter 8, section 8.6.4.2.
62	The geochemical characterisation of coal (ROM and product coal) will also be ongoing as the project develops, with representative coal samples included in future assessments. Additionally, further assessment will be undertaken as required to characterise waste products including surface run-off and seepage from waste rock dumps.	Chapter 9, section 9.3
63	Out of pit waste rock dumps will be created adjacent to the coal mining areas within the project area. Once there is sufficient space for in-pit dumping, pits will be progressively backfilled with waste rock to their final land form.	Chapter 1, section 1.4; Chapter 9, section 9.6.1.
64	A Mine Waste Management Plan will be developed to characterise and classify waste rock and guide the placement of waste rock within each waste rock dump with the objective of placing the most benign waste rock near the surface of the waste rock dump.	Chapter 9, section 9.6.2 and 9.8; Chapter 10, section 10.5.1; Chapter 26, section 26.6.
65	Surface run-off and seepage from waste rock dumps and any rehabilitated areas will be monitored for a standard suite of water monitoring parameters including pH, electrical conductivity, sulfate (and other major ions) and a broad suite of soluble metals.	Chapter 9, section 9.6.3; Chapter 10, section 10.5.1.
66	Rejects management will: • produce stable rejects (either buried in-pit or contained within a co-disposal dam that will be decommissioned and rehabilitated) • minimise disturbance to the environment by placing coarse rejects in-pit in the initial years of operation and all rejects in-pit in later years of operation • minimise risks to the environment through appropriate design and construction of rejects management facilities, encapsulation of rejects in-pit and decommissioning and rehabilitation of co-disposal facilities and waste rock dumps.	Chapter 9, section 9.7.

#	Proponent commitment	EIS reference
67	The following objectives have been derived for decommissioning and rehabilitation of areas disturbed by the project: • The mine site will be safe to humans and fauna • Mining and rehabilitation will create a landform that is stable and with land use capabilities and/or suitability as determined in the Rehabilitation Management Plan (RMP). Mine wastes and disturbed land will be rehabilitated so that they are non-polluting and self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use • Surface and ground waters that leave the project area will not be degraded compared to their condition prior to the commencement of mining operations. Current and future water quality, other than water quality impacts associated with subsequent land users, will be maintained at levels that are within defined water quality criteria • Hazardous materials will be identified and adequately managed to ensure the site is non-polluting; Potential for acid mine drainage will be determined and will be adequately managed to ensure the site is non-polluting. Vegetation cover will be established to reduce rates of erosion and sediment loss • Final rehabilitation will be designed as permanent self sustaining landforms requiring no ongoing maintenance or management.	Chapter 10, sections 10.2, 10.3.2, 10.5.4 and 10.8.
68	Determination of post-mining land use will be made in consideration of the rehabilitation hierarchy.	Chapter 10, section 10.3.2.
69	Those areas not proposed for disturbance will likely retain the pre-mining land use.	Chapter 10, section 10.3.2.
70	Where reinstatement of a 'natural' ecosystem is not feasible consideration will be made to the next strategy outlined within the rehabilitation hierarchy, being the development of an alternative outcome with a higher economic value than the previous land use.	Chapter 10, section 10.3.2.
71	There will be some areas of the mine site, such as the final voids, that are not returned to their previous land use. These areas will be developed to a lower value land use, but will be left in a stable condition that minimises the potential to generate future pollution or adversely affect environmental values.	Chapter 10, section 10.3.2.
72	The proponent will develop a RMP which describes the post mine land uses within two years of the effective date of the environmental authority for the project.	Chapter 10, sections 10.3.2 and 10.7.
73	Waste rock dumps will be designed, shaped, capped with topsoil and revegetated in accordance with a Mine Waste Management Plan. Dumps will be designed and engineered to be geotechnically stable and safe. The final landform of waste rock dumps will be determined in the RMP. Dumps will be levelled out to cap all materials and shaped to provide a gently undulating landform.	Chapter 10, section 10.5.
74	Ongoing monitoring of the success of rehabilitation will be undertaken in accordance with the RMP.	Chapter 10, section 10.5.1.
75	The proponent has committed to undertaking revegetation/rehabilitation field trials for waste rock materials when operations commence and bulk materials become available.	Chapter 10, section 10.5.1.

#	Proponent commitment	EIS reference
76	Suitable topsoil and subsoils that have been stripped prior to mining will be applied to the surface of the dumps. A Soil Management Plan will be developed to identify the soils best suited to rehabilitation at the recommended depth (300mm) from the potentially available surface and subsurface materials.	Chapter 10, sections 10.5.1 and 10.6.1; Chapter 13, sections 13.6.2.2, 13.6.3.2 and 13.7; Chapter 26, section 26.3.3.
77	Final void design will consider the geotechnical stability of high walls and low walls formed by waste rock dumps.	Chapter 10, section 10.5.2.
78	The low wall (comprising the in-pit waste rock dumps) will be battered back from the angle of repose to ensure the long term geotechnical stability of the face. Determination of geotechnical stability will be based on an assessment of the waste rock material, the likely degree of settlement, and the degree of weathering expected in the long term. Drainage over the low wall will be minimised and controlled to reduce erosion.	Chapter 10, section 10.5.2.
79	The CHPP and mining support infrastructure will be dismantled and removed upon completion of the mining operations. The plant concrete bases and footings will be removed and the area ripped, reshaped and topsoil applied before revegetation. Drainage control through ripping, profiling or the provision of erosion control structures will also be undertaken. Any infrastructure that is considered to be of beneficial use to the subsequent landholder will be retained, if requested.	Chapter 10, section 10.5.3; Chapter 25, section 25.7.
80	A contaminated land assessment of the coal stockpile areas, fuel storage area, chemical storage areas, waste storage/transfer areas, effluent treatment plant area, treated effluent irrigation area and any other potentially contaminated sites will be undertaken to identify any potential contamination. Where contaminated land cannot be remediated in the post-mining landscape it will be managed on-site.	Chapter 10, section 10.5.3, 26.3.5.
81	Any metals or materials that may contaminate the site (e.g. batteries, waste oils) will be removed from site and disposed of at an appropriately licensed waste disposal facility.	Chapter 10, section 10.5.3.
82	Once decommissioned, the rehabilitation strategy for infrastructure areas will be to: rip compacted areas to between 0.5 - 1 m; apply stripped subsoils and topsoil material (average between 100-150 mm); scarify the surface (immediately before seeding); seed with appropriate seed mix; control weed species.	Chapter 10, section 10.5.3
83	Mine water management infrastructure will be retained where agreed by the post-mining landowner.	Chapter 10, section 10.5.5.
84	Any plan to retain water storage facilities post mining will consider the water quality and quantity requirements.	Chapter 10, section 10.5.5
85	The objectives for drainage diversion are to: create a drainage that operates as part of a self-sustaining stream system and promotes nutrient processing, ecological connectivity and sediment storage and transport; whenever practical, avoid the use of artificial grade control structures or other structures that are likely to require maintenance beyond life of mine; include natural, locally and regionally occurring geomorphic and habitat features; create a drainage where the diversion and adjoining reaches establish a state of dynamic equilibrium (equal rates of sediment erosion and deposition).	Chapter 10, section 10.5.6.

#	Proponent commitment	EIS reference
86	Revegetation will include the use of a mixture of locally indigenous groundcover, shrubs and overstorey species and, if available, the introduction of woody debris for additional habitat once the vegetation has established.	Chapter 10, section 10.5.6.
87	The rehabilitation objectives for haul roads and access roads are: Establishment of post-mine land use in accordance with the RMP; hazardous or contaminated material or areas are identified and managed; erosion rates are managed to levels that do not compromise post-mine land use; run-off or seepage water quality does not present a risk of environmental harm; ongoing management requirements are similar to non-mined land.	Chapter 10, section 10.5.7.
88	The rehabilitation objectives for train loading facilities (TLFs) are: Establishment of post-mine land use in accordance with the RMP; removal of infrastructure, unless approved for use by another party; hazardous or contaminated material or areas are identified and managed; erosion rates are managed to levels that do not compromise post-mine land use; run-off or seepage water quality does not present a risk of environmental harm; ongoing management requirements are similar to non-mined land.	Chapter 10, section 10.5.8.
89	At the end of mine life, the TLFs (incorporating rail loop and rail spur) will be decommissioned, including removal of all infrastructure (rails, sleepers) and rail ballast material except if the infrastructure is approved for use by another party.	Chapter 10, section 10.5.8.
90	The rehabilitation objectives for linear infrastructure (power lines and water pipelines) are: establishment of a post-mine land use in accordance with the RMP; removal of infrastructure, unless approved for use by another party or where removal of buried infrastructure would create more environmental damage than leaving in-situ; erosion rates are managed to levels that do not compromise post-mine land use; run-off or seepage water quality does not present a risk of environmental harm; ongoing management requirements are similar to non-mined land.	Chapter 10, section 10.5.9.
91	If they are not retained, infrastructure will be removed from site and disturbance corridors will be undergo deep ripping, profiling, application of topsoil and seeding.	Chapter 10, section 10.5.9.
92	Buried water pipelines will be left in-situ as the pipeline rights of way will be progressively rehabilitated following construction and installation.	Chapter 10, section 10.5.9.
93	Unless soil quality dictates otherwise, surface soils and subsoils in areas proposed for disturbance will be stripped and stockpiled in the initial years of operation for use in rehabilitation once waste rock dumps are stabilised. Once waste rock dumps are stabilised, topsoil stripped in advance of the expanding open pit will be re-used for rehabilitation with no or minimal stockpiling.	Chapter 10, section 10.6.1.
94	Stockpiles will not exceed a maximum height of two m.	Chapter 10, section 10.6.1.
95	Stockpiles will be located away from drainage lines or watercourses and areas that may be subject to flooding or water logging or where they could be impacted by vehicular traffic and contamination from mine wastes.	Chapter 10, section 10.6.1.
96	Soil stockpiles will be sown with a protective cover (e.g. fast growing pasture species) selected for rehabilitation.	Chapter 10, section 10.6.1.

#	Proponent commitment	EIS reference
97	Trials will be undertaken to establish the optimum species to provide vegetation cover of waste rock dumps and other disturbed areas.	Chapter 10, section 10.6.3.
98	Direct seeding is the preferred method for enhancing regeneration of vegetation from soils. However other methods such as direct planting of nursery stock will be investigated.	Chapter 10, section 10.6.3.
99	Vehicle wash down facilities located at the mine site will be used to clean vehicles of weed seeds.	Chapter 10, section 10.6.3.
100	Material or fill used in any works (including rehabilitation) that is imported to site will be required to be inspected and declared weed free.	Chapter 10, section 10.6.3.
101	Planning for rehabilitation will consider annual or seasonal requirements and hence activities will be timed to ensure that erosion control structures, topsoil spreading and seeding operations are conducted at the optimal time of the year.	Chapter 10, section 10.6.3.
102	Monitoring of rehabilitation success will be conducted at locations representative of the range of conditions impacting the rehabilitating areas.	Chapter 10, section 10.6.4.
103	Monitoring of soil erosion in rehabilitated areas will be included as part of the rehabilitation program.	Chapter 10, section 10.6.4.
104	If monitoring and assessment results indicate that the rehabilitation objectives may not be achieved, then the rehabilitation strategy will be modified.	Chapter 10, section 10.6.4.
105	For all indicators that are selected, the RMP will: state what objective(s) the indicator relates to; justify the selection of the indicator, including how the relationship between the indicator and the objective has been established; state how the indicator is to be measured; state how the results will be reported and interpreted.	Chapter 10, section 10.7.
106	Completion criteria will be nominated to represent rather than recreate exactly representative native vegetation communities.	Chapter 10, section 10.7.
107	In addition completion criteria and indicators will be developed for the final void (and any other areas that are potentially not returned to grazing land) which include: • geotechnical stability of the final void • security and access to the final void.	Chapter 10, section 10.7.
108	The proponent will develop a Mine Closure Plan four years prior to final coal processing.	Chapter 10, section 10.8; Chapter 35, section 35.7.2.
109	Adequate financial provision will be made for the cost of mine closure.	Chapter 10, section 10.8.2.
110	Rehabilitated waste rock dumps will be contoured to direct surface runoff away from the pit lakes, effectively eliminating the surface runoff component of flow from this catchment.	Chapter 11, section 11.3.1.1.
111	The proposed levees around the pits will be designed to cope with a 1:1000 year storm event with appropriate geotechnical safety factors. The structures will be permanent self-sustaining features and will not require any monitoring or maintenance.	Chapter 11, section 11.5.3.2; Chapter 16, section 16.8.
112	The final voids will have sides where access prevention has been a consideration and will be fenced/bunded around the perimeter to minimise the potential for stock access to voids.	Chapter 11, section 11.6.5.

#	Proponent commitment	EIS reference
113	Data will be collected over the life of the mining operation to provide key indicators to the likely quality of the water that will contribute to the pit lakes. This data will be used to prepare a strategy for the final voids which will aim to ensure that they are safe and stable and to minimise the risk of impacts to the environmental and human health.	Chapter 11, section 11.7 and 11.8.
114	The proponent will develop and implement Fire Management Plans to reduce the risk of causing bushfires, which will include working closely with regional and local fire service providers.	Chapter 12, section 12.3.5; Chapter 18, section 18.4.2.11.
115	Roads and other civil infrastructure will be designed to include suitable drainage. Ongoing maintenance and repairs will be conducted as required.	Chapter 12, section 12.3.6.
116	Infrastructure will be designed for severe weather events.	Chapter 12, section 12.3.6.
117	Where rehabilitation success is compromised due to cyclone damage, damage will be repaired and rehabilitation works restarted.	Chapter 12, section 12.3.6.
118	A Bushfire Management Plan, Rehabilitation Management Plan and Emergency Response Plan (ERP) will be implemented for the project.	Chapter 12, section 12.3.6; Chapter 35, section 35.7.2.
119	Equipment, machinery, roads and other civil works will be designed to the specification required to withstand heat stress caused by an increase in average ambient temperatures.	Chapter 12, section 12.6.1.
120	The proponent will establish heat and fatigue management procedures, including provision of shade structures, water coolers, scheduled rest breaks.	Chapter 12, section 12.6.1.
121	The proponent will monitor changes in the climate over the life of the project and update rehabilitation strategies based on specialist advise (e.g. from ecologists, soil scientists and meteorologists) to maximise the probability of progressive and final rehabilitation success.	Chapter 12, section 12.6.1.
122	The site water management system and site water balance will consider existing extremes in climate such as drought periods. Current mine water planning will consider water supply during periods of drought and the adequacy of off-site water supplies to provide uninterrupted supply of water.	Chapter 12, section 12.6.2.
123	CHPP design and use of water at the mine site will be optimised to minimise water use.	Chapter 12, section 12.6.2.
124	Roads and other civil infrastructure works will be regularly inspected and maintained, especially following periods of intense rainfall.	Chapter 12, section 12.6.2.
125	During the detailed design phase of the project, predictions of increased frequency and duration of droughts will be considered in assessing ongoing security of water supply and contingency plans developed to cater for such events.	Chapter 12, section 12.6.3.
126	Buildings and other structures will be designed to applicable Building Codes Australia (BCA) standards and wind strength ratings.	Chapter 12, section 12.6.5.
127	Project infrastructure will be inspected and repaired following extreme weather events.	Chapter 12, section 12.6.5.
128	The proponent will develop emergency management plans for extreme weather events.	Chapter 12, section 12.6.5.

#	Proponent commitment	EIS reference
129	In the event that a suspected significant fossil is encountered, mine operations will be managed to preserve the find. The find will be assessed by a mine geologist and reported to the regulator (or appropriate government agency).	Chapter 13, section 13.3.4.
130	Geotechnical studies will be conducted on the stability and suitability of soils for construction purposes, including for pipelines.	Chapter 13, section 13.5.4.
131	Watercourse and drainage line diversions will remain following mine closure to permanently divert water around areas of altered topography, these will be completed to be stable, self sustaining and require no ongoing management or monitoring.	Chapter 13, sections 13.6.2.2 and 13.7.
132	An Erosion sediment control plan (ESCP) will be developed for the project. Erosion and sediment control will be in accordance with the Soil Erosion and Sediment Control-Engineering Guidelines for Queensland Construction Sites and the EPA Best Practice Urban Stormwater Management-Erosion and Sediment Control guideline. Additional guidance will be obtained from International Erosion Control Association (IECA) (2008) Best Practice Erosion and Sediment Control. The ESCP will be approved by a suitably qualified person (such as a Certified Professional in Erosion and Sediment Control). The ESCP will be amended as the mine develops to account for changes in final landform design and infrastructure locations.	Chapter 8, section 8.6.2; Chapter 13, sections 13.6.4.3 and 13.7; Chapter 15, section 15.7.2; Chapter 19, sections 19.6.1.3 and 19.6.1.4.
133	Boundaries of areas to be cleared will be delineated on project drawings and/or in the field to define the extent of authorised clearing. Clearing will be authorised by use of a 'permit to clear' system.	Chapter 13, section 13.6.4.3.
134	All drainage structures and sediment controls will have design specifications appropriate to the rainfall regime and design life.	Chapter 13, section 13.6.4.3.
135	Grading of soil will be away from watercourses (except where watercourses are realigned or crossed) and any stockpiled material will be located at least 10 m from any watercourse.	Chapter 13, section 13.6.4.3.
136	Rehabilitated mine landforms will be designed to minimise slope angle and length.	Chapter 13, section 13.6.4.3.
137	Monitoring of the performance of erosion and sediment control structures will be carried out both pre- and post-wet season and following any significant events.	Chapter 13, section 13.6.4.4.
138	Felled timber will be removed from the area and stockpiled away from the watercourse.	Chapter 13, section 13.6.5.2.
139	Where buried infrastructure crosses a drainage line, work will be preferentially scheduled for the dry season (no flow conditions) with sufficient lead time to allow any backfilling and stabilisation to take place prior to wet season flows.	Chapter 13, section 13.6.5.2.
140	The discharge of diverted water (piped or pumped) will not cause stream bed or bank erosion downstream of the works.	Chapter 13, section 13.6.5.2.
141	Following the initial years of soil stripping and stockpiling, soils will be used directly in rehabilitation in preference to stockpiling.	Chapter 13, section 13.7.
142	The proponent will negotiate compensation arrangements with landholders that are directly impacted.	Chapter 14, section 14.3.2, 14.7; Chapter 34, section 34.4.

#	Proponent commitment	EIS reference
143	The proponent will undertake the necessary process and procedures under the *Strategic Cropping Land Act 2011* (SCL Act) to validate strategic cropping land (SCL), consistent with the guidelines (DERM 2011).	Chapter 14, section 14.3.7.
144	Management strategies to ensure full compliance with the ACH Act and the QH Act have been developed and will be applied in the event any of these are discovered.	Chapter 14, section 14.3.10.1.
145	Any soils that are suspected to be contaminated from visual/odour indications will be captured and contained pending further investigation.	Chapter 14, section 14.4.10.
146	Any crossings points for the North Queensland Gas Pipeline will be designed and constructed to prevent impacts resulting in failure of the buried pipeline.	Chapter 14, section 14.6.5.1.
147	Any crossings points for the Burdekin to Moranbah Pipeline (water) will be designed and constructed to prevent impacts resulting in failure of the buried pipeline.	Chapter 14, section 14.6.5.1.
148	Any crossings points for the Newlands Pipeline (water) will be designed and constructed to prevent impacts to the buried pipeline.	Chapter 14, section 14.6.5.1.
149	Where the Newlands Rail System and the proposed Alpha Coal Project rail lines intersect the central infrastructure corridor, specially designed and constructed infrastructure (e.g. bridges) will be provided for crossing points to prevent interaction between trains on the rail lines and mine vehicles or linear infrastructure.	Chapter 14, section 14.6.5.1.
150	Where waste rock will be hauled or conveyed across the Newlands Rail System and the proposed Alpha Coal Project rail lines, specially designed and constructed infrastructure (e.g. bridges) will be provided for crossing points to prevent interaction between trains on the rail lines and mine vehicles or equipment.	Chapter 14, section 14.6.5.1.
151	Where project linear infrastructure will intersect existing power lines, crossing points will be designed in conjunction with power line operators / owners.	Chapter 14, section 14.6.5.1.
152	The proponent will consult Xstrata Coal Queensland Pty Ltd, the applicant for the mining lease for transport (MLA 70460) that traverses the project area, about all construction and operational issues where there is potential for interaction between project activities.	Chapter 14, section 14.6.6.
153	Mine closure planning will consider the choice of post-mining land use. The final land use will largely be dependent on pre-mining land suitability, landholder preferences for land use, the potential uses of likely rehabilitated landforms, and the existing use or environmental values of surrounding land.	Chapter 10, section 10.8; Chapter 14, section 14.6.8.
154	If existing contaminated sites are identified during activities, then measures will be implemented to investigate and, if required, isolate and manage contaminated materials.	Chapter 14, section 14.7.
155	The draft WQO's will be used for setting release limits for mine affected water and sediment affected water applicable for the project.	Chapter 15, section 15.6.4.
156	A portion of the catchment of diversion 3 which remains after the drainage realignment and will flow towards South Pit 1, will be dammed to prevent surface runoff from entering the mining areas of South Pit 1.	Chapter 15, section 15.7.5; Chapter 16, section 16.6.1.3.

#	Proponent commitment	EIS reference
157	A small drainage line diversion is planned to allow water to bypass the North Pit and flow to Kangaroo Creek. This drainage diversion will be in place before mining operations commence at the North Pit. The drainage diversion put in place will remain as a permanent structure to divert water around the North Pit and its final void.	Chapter 16, section 16.6.1.5.
158	The diversion channels will be stable, self sustaining and require no ongoing monitoring or management.	Chapter 16, section 16.6.4.
159	The toe of the waste rock dump of East Pit 1 will either be relocated outside the flood extent, or constructed in a manner such that it is non-erodible when in contact with flood waters.	Chapter 16, section 16.6.4.4.
160	The preliminary design of the diversion channels will need to be reviewed during detailed design, and will rely on geotechnical advice to confirm the design parameters and stability of the banks to control erosion and scour.	Chapter 16, section 16.7.5.
161	The proponent has installed automatic groundwater level data loggers in several of the dedicated groundwater monitoring bores to continue to monitor seasonal groundwater level fluctuation in bores BYGW05, BYGW07A and BYGW09.	Chapter 17, section 17.4.13.
162	Water samples will be collected in alignment with the Queensland Water Quality Guidelines 2009 (DERM, 2009) unless circumstantial departures (such as equipment failure) preclude data gathering in the prescribed manner.	Chapter 17, section 17.4.14.
163	Where practicable, private groundwater bores RN 25633, 25636, 25638, 25686, 60458, 60459, 100092 and 100274 will be measured for their groundwater level and groundwater quality before project mining commences to establish their baseline groundwater status, with regular monitoring undertaken thereafter. More frequent quarterly monitoring of project groundwater monitoring bores (which are located in close proximity to these bores) will be undertaken for level and quality to provide comparative data on the groundwater in the areas of these bores.	Chapter 17, section 17.5.2.
164	Should impact in private bores be detected that have the potential to be related to project activities, an investigation into the cause will be undertaken. Depending on the issue investigations may include confirmatory water quality sampling, comparison against private bore baseline levels, project bore water level trends, project activities and any known third party activities, as well as make recommendations as to short, medium or long terms impacts, as well as required management or mitigations.	Chapter 17, section 17.5.2.
165	Preventative measures, such as selective placement of waste rock within waste rock dumps will assist in reducing any potential impacts on groundwater.	Chapter 17, section 17.5.4.
166	The proponent will adopt hydrocarbon and chemical handling, storage and spill response procedures for all phases of the project that will minimise the risk of contaminant release and contain any accidental releases.	Chapter 15, section 15.7.3; Chapter 17, section 17.5.6.
167	The construction of co-disposal dams will include seepage detection mechanisms systems based on the RPEQ design, which can include, regular surveyed level monitoring, dam specific water balances and monitoring bores installed near co-disposal dams to detect seepage and measure seepage quality, if any.	Chapter 17, section 17.5.6.

#	Proponent commitment	EIS reference
168	The following groundwater monitoring strategy will be implemented by the proponent during construction, operations and decommissioning: • The groundwater monitoring bore suite will consist of the following bores: BYGW01, BYGW02, BYGW03, BYGW04, BYGW05, BYGW06, BYGW07A, BYGW07B, BYGW08, BYGW09, BYGW10. • Monitoring of project groundwater monitoring bores will be undertaken on a quarterly interval basis for water level and water quality. This will provide data on the groundwater in the areas of operation, data on groundwater around private bores (several bores have been located to allow delineation of any potential project related impact on private landholder bores) and data on regional groundwater for comparison (several bores are located well outside of potential impact). • Automatic water level data loggers will remain in BYGWB05, BYGW07A and BYGW09 to capture daily groundwater levels which will enable sufficient temporal resolution for trend analysis on groundwater level fluctuations. • Groundwater samples will be retrieved during monitoring to allow more robust statistical analysis of water quality and comparison against contaminant trigger limits. • The dedicated groundwater monitoring bores will continue to be sampled in accordance with the Water Quality Sampling Manual produced by the former Department of Environment and Resource Management. • All groundwater samples will be submitted to a NATA accredited laboratory for analysis. • Daily rainfall will be measured and recorded. • The data from the groundwater monitoring bores will be reviewed at minimum six-monthly intervals.	Chapter 17, section 17.5.7.

#	Proponent commitment	EIS reference
169	The proponent will develop a groundwater monitoring plan, incorporating the strategies described above and incorporating standards and indicators against which groundwater impacts can be measured. Specifically if monitoring indicates a change in groundwater elevation > 2m compared to the previous quarterly monitoring event, results will be reported to the regulatory authority, which will include an investigation into the cause, potential short, medium or long term impacts and any required management or mitigations. Water quality criteria will be monitored for change and compared against a range of investigation level criteria based on baseline data. This will include physiochemical parameters, metals and hydrocarbons. Groundwater contaminant parameters and trigger levels (i.e. indicators) will be finalised based on a background groundwater monitoring program and be submitted to the administering authority by commencement of mining operations. If groundwater contaminant trigger levels are exceeded then the proponent will complete an investigation into the potential for environmental harm and notify the administering authority within 30 business days of receiving the analysis results. Any required remedial action will be agreed upon with the relevant regulator and would be undertaken within an agreed timeframe. In addition bore performance will be reviewed annually for function and suitability, and recommendations made for maintenance or replacement of bores where required. A groundwater monitoring program will be implemented within the project area for the life of the project which includes frequency and location of monitoring, and the parameters to be monitored. The monitoring requirements for groundwater are included in the EM Plan.	Chapter 17, section 17.5.7.
170	Impacts on habitat and associated fauna will be minimised by: minimising vegetation clearance along drainage features in order to maintain bank stability, habitat connectivity and movement corridors for terrestrial fauna species and a habitat refuge for fauna seeking shelter and water; clearing riparian vegetation in a staged manner to allow fauna to migrate to adjacent habitats; having a suitably qualified spotter-catcher available when clearing in habitat areas; progressive rehabilitation of mined areas to incorporate the provision of nest hollows and microhabitat features such as trees and logs.	Chapter 18, section 18.4.2.2; Chapter 35, section 35.7.3.
171	Modelling undertaken by KBR (2012a) indicates that armouring would be required to prevent scouring of the waste rock dump during a 1000 year ARI flood event which has the potential to encroach further on this corridor. Placement of waste rock would need to be closely supervised to ensure no unnecessary clearing occurs and that water and sediment are managed to avoid impacts on vegetation and water quality within and adjacent to the Suttor River.	Chapter 18, section 18.4.2.3; Chapter 35, section 35.7.4.
172	Impacts associated with waterway crossings will be reduced by minimising the number of crossings required, designing to prevent scour and implementing appropriate sediment and erosion controls at crossing points.	Chapter 18, section 18.4.25; Chapter 35, section 35.7.6.3.
173	High intensity activities such as blasting will be generally restricted to daylight hours which will minimise impacts on the breeding and feeding behaviour of nocturnal animals.	Chapter 18, section 18.4.2.8; Chapter 35, section 35.7.10.

#	Proponent commitment	EIS reference
174	Where an infrastructure corridor crosses fauna movement corridors, the crossing areas will be designed to minimise the potential for interaction with fauna. Reduced speed limits will also be adopted along the infrastructure corridor to minimise the risk for interaction with fauna by vehicle collision.	Chapter 18, section 18.4.2.10; Chapter 35, section 35.7.12.
175	Watercourse crossings associated with haul roads connecting open-cut pits and the mine infrastructure areas will be designed to minimise the potential for vehicle interaction with fauna.	Chapter 18, section 18.4.2.10; Chapter 35, section 35.7.12.
176	Native fauna injured during construction and operational phases of the project would be taken to a vet or wildlife carer.	Chapter 18, section 18.4.2.10; Chapter 35, sections 35.7.4 and 35.7.12.
177	In the event of injuries to domestic fauna or livestock, personnel would call for veterinary assistance and notify the appropriate landholder.	Chapter 18, section 18.4.2.10; Chapter 35, section 35.7.12.
178	Appropriate management systems will be put in place to prevent accidental ignition of fires as well as spontaneous combustion of coal. This will include active watering, orientation of stock and waste piles based on wind directions, and wind breaks.	Chapter 12, section 12.3.5; Chapter 18, section 18.4.2.11; Chapter 35, section 35.7.13.
179	Vegetation retained on site will be managed for fuel load and appropriate fire regimes will be put in place to maintain biodiversity values while minimising the risk of bushfire.	Chapter 18, section 18.4.2.11; Chapter 35, sections 35.7.13 and 35.10.1.3.
180	Fire regimes and management measures will be documented in a site-specific fire management plan.	Chapter 18, section 18.4.2.11; Chapter 35, section 35.7.13.
181	Weed management measures to be implemented in the project area include: • Wash down facilities will be constructed at access points for vehicles arriving and departing from the project site. These facilities will be bunded and located away from drainage lines to minimise the risk of weed spread. • Vehicles entering the project site and leaving properties known to contain declared weeds will be thoroughly washed down before entering clean areas; ensuring that wheels, wheel arches and the undercarriage are free of mud and plant material. • Radiators, grills and vehicle interiors will be cleaned of accumulated seed and plant material. • Drivers will be advised to keep vehicles to roads or compacted surfaces (preventative) and reduce vehicle movements in wetted soil where avoidance is not possible. • Identified weeds of management concern, including declared and environmental weeds, will be controlled in accordance with local best practice management as described in the pest fact sheets published by the Department of Agriculture, Fisheries and Forestry. Treated areas will be monitored to assess the success of declared weed eradication. • Weed management will be included in the site induction program for the project to promote awareness of weed management issues. Implementation of the Weed and Pest Management Plan provided as part of the EM Plan.	Chapter 10, section 10.6.3; Chapter 18, sections 18.4.2.12 and 18.4.4.3; Chapter 35, sections 35.7.14 and 35.8.1.

#	Proponent commitment	EIS reference
182	The following general mitigation measures are proposed for the management of pest animal species: • appropriate disposal and management of wastes on site • implementation of the Weed and Pest Management Plan provided as part of the EM Plan.	Chapter 18, section 18.4.2.13; Chapter 35, section 35.7.15.
183	Impacts on endangered and of concern REs will be minimised by marking the areas to be cleared to avoid unnecessary loss of these communities.	Chapter 18, section 18.4.4.1.
184	Separate stockpiling of cracking clay soils supporting brigalow and natural grassland communities and soils supporting the SEVT TEC for use in rehabilitation and/or offset areas will be considered.	Chapter 18, section 18.4.4.3; Chapter 35, section 35.8.1.
185	Impacts on remnant watercourse vegetation will be mitigated by; designing the central infrastructure corridor to minimise the number of waterway crossings where it intersects Kangaroo Creek and tributaries; maintaining adequate buffers from the Suttor River riparian corridor, and providing appropriate scour and erosion protection to maintain the integrity of vegetation and ecological function; restricting disturbance of watercourse vegetation to that necessary for the works; maintaining adequate buffer distances from watercourses not directly impacted by mining; emulating natural vegetation communities along realigned watercourses through planting endemic species characteristic of the original vegetation communities impacted.	Chapter 18, section 18.4.4.4; Chapter 35, section 35.7.4.
186	Appropriate fire management regimes will be implemented to minimise the potential for adverse impacts on *Cerbera dumicola*.	Chapter 18, section 18.4.4.5.
187	Management measures for the Ornamental snake will focus on minimising the impact on riparian vegetation associated with the location of the waste rock dumps within the Suttor River floodplain. Adequate buffers will be maintained from retained vegetation and scour protection provided for waste rock dumps within the Suttor River floodplain to minimise the potential for erosion, sedimentation and associated impacts on water quality, particularly during larger flood events. Vehicle movements around the dump will be minimised, particularly at night, to reduce the risk of vehicle strike and the disruption associated with lighting in this habitat. The Queensland Brigalow Belt Reptile Recovery Plan (Richardson, 2008) covers 16 threatened reptile species, including the Ornamental snake. Of the management practices recommended in the recovery plan for the continued survival of reptile species (including the Ornamental snake), the project will be able to ensure compliance with the following: • managing the impact of feral animals • adaptive fire management.	Chapter 18, section 18.4.5.1; Chapter 35, section 35.8.2.1.
188	Vehicle movements around the waste rock dumps within the Suttor River floodplain will be minimised, particularly at night, to reduce the risk of vehicle strike and the disruption associated with lighting in this habitat.	Chapter 18, section 18.4.5.1; Chapter 35, section 35.8.2.1.
189	The use of plain wire, opposed to barbed wire will be considered to reduce juvenile Black-necked storks (as well as other species prone to collision (e.g. kangaroos, emus)) collision and probably mortality.	Chapter 18, section 18.4.5.1.
190	Where possible, clearing in proximity to water will be undertaken outside breeding times for the Squatter pigeon (September through October), with fauna spotter-catchers employed to search for nests and/or stir up birds ahead of clearing works outside these times.	Chapter 18, section 18.4.5.1; Chapter 35, section 35.8.2.2.

#	Proponent commitment	EIS reference
191	Reduced speed limits will be imposed on haul roads close to watering points during the construction and early operational phases of the project prior to the removal of suitable habitat from within the project footprint.	Chapter 18, section 18.4.5.1; Chapter 35, section 35.8.2.2.
192	Impacts on the Black-throated finch will be mitigated by conducting detailed searches of nesting habitat within proximity to important water sources (i.e. transects along the Suttor River riparian corridor and dam at H2) and replicating suitable habitats where possible.	Chapter 18, section 18.4.5.1; Chapter 35, section 35.8.2.3.
193	The spoil pile located west of South Pit 1 will be managed to reduce the probability of habitat degradation within the Suttor River riparian areas.	Chapter 18, section 18.4.5.2; Chapter 35, section 35.8.3.1.
194	Impacts on the common death adder will be managed by employing fauna spotter-catchers to flush out individual animals prior to clearing in remnant areas and implementing appropriate weed, pest and fire management protocols and measures to reduce vehicle strike.	Chapter 18, section 18.4.5.1.
195	Impacts on the rainbow bee-eater will be mitigated by timing works in and around watercourses to avoid breeding times (September to February) where possible and by deploying fauna spotter-catchers to search for nest burrows in stream banks when works during this period cannot be avoided.	Chapter 18, section 18.4.5.2.
196	Impacts on breeding habitat for the rufous fantail will be mitigated by minimising impacts on the Suttor River riparian corridor.	Chapter 18, section 18.4.5.2; Chapter 35, section 35.8.3.5.
197	Vegetation mapping and data will be submitted to the Queensland Herbarium to assist with updating the CORVEG database, as part of the approvals process.	Chapter 18, section 18.2.
198	Where possible, construction of diversion channels and dewatering of impacted waterways would occur during the dry season, when the extent of wetted habitat in the project area is greatly reduced, and when streams are expected to support the lowest diversity and abundance of aquatic species.	Chapter 19, section 19.6.1.1.
199	Any disturbance to breeding places would be undertaken in accordance with an approved species management program (SMP), damage mitigation permit (DMP), or other relevant authorisation, to ensure compliance with the NC Act.	Chapter 19, section 19.6.1.1.
200	A General Fisheries Permit under the *Fisheries Act 1994* would be obtained to take, remove, or relocate fish during site establishment.	Chapter 19, section 19.6.1.1.
201	Diversion management will include measures to establish riparian corridors to achieve riparian vegetation continuity along diversion channels.	Chapter 19, section 19.6.1.1.
202	Monitoring of the diversion channels would include the physical condition (e.g., bank stability, erosion, and physico-chemical water quality), and biological condition (e.g., vegetation cover, health, and utilisation by aquatic fauna).	Chapter 19, section 19.6.1.1.
203	The disturbance of lacustrine water bodies (dams) would be undertaken in accordance with an approved SMP, DMP, or other relevant authorisation, to ensure compliance with the NC Act.	Chapter 19, section 19.6.1.2.
204	The current hydrological regimes of the palustrine wetland on the western boundary of the project area will be reinstated through rehabilitation of the West Pit complex waste rock dump.	Chapter 19, section 19.6.1.3 and 19.7.

#	Proponent commitment	EIS reference
205	A culling program for feral pigs will be considered to minimise damage to the palustrine wetland areas which are intended to be a seed source for the broader wetland upon its reinstatement.	Chapter 19, section 19.6.1.3.
206	A suitable baseline assessment and ongoing monitoring will be undertaken to monitor the status of the palustrine wetland, including seasonal variation. These monitoring requirements would be included in the receiving environment monitoring program (REMP).	Chapter 19, section 19.6.1.3.
207	Clearly defined access and work use areas for plant and equipment will be established.	Chapter 19, section 19.6.1.4.
208	Areas for vehicle and machinery maintenance, refuelling, and storage of fuels, lubricants, and batteries will be bunded in accordance with AS 1940.	Chapter 19, section 19.6.1.4.
209	Emergency spill kits will be available and readily accessible for all plant and equipment at all times. The kits will include equipment for containment and clean-up of spills on dry soils/sediments, and in water (e.g. floating booms).	Chapter 19, section 19.6.1.4.
210	Stream crossings will be designed in a way that maintains or enhances water flows, water quality, stream ecology and existing riparian vegetation.	Chapter 19, section 19.6.1.5.
211	Sedimentation dams will be utilised until disturbed areas are sufficiently rehabilitated and stabilised.	Chapter 19, section 19.6.2.2.
212	The proponent has proposed a practical strategy for offsetting significant impacts at the State level. All offsets proposed in this strategy will serve to benefit multiple species or communities at both the Commonwealth and State levels.	Chapter 21, sections 21.1, 21.4 and 21.8.
213	The proponent proposes to offset TEC areas identified in Table 21-1 and Table 35-37 of the EIS.	Chapter 21, section 21.3.1.
214	Vegetation associated with potential habitat for threatened species will be affected by project activities. The proponent proposes to offset an area of potential habitat for the Ornamental snake (*Denisonia maculata*), listed as vulnerable under the EPBC Act, that may be impacted by the project. The area of potential habitat which is proposed to be offset corresponds to endangered and of concern REs associated with habitat requirements for the species which will be impacted within the project area. These impact areas proposed for offsets relating to the Ornamental snake are presented in EIS Table 21-2 and Table 35-38.	Chapter 21, section 21.3.2; Chapter 35 section 35.11.2.2.
215	A biodiversity offset package will be prepared that will: • address the requirements of the Environmental Offsets Policy (EOP) for a land based offset • identify the ecological score of the impact site • identify the ecological score of the proposed offset site • address the relevant approval conditions • address any criteria required by the Queensland Government for the offset management plan • develop an Offset Area Management Plan/s which will be as per the requirements of the EOP and the Voluntary Declaration • secure a legally binding mechanism on Title.	Chapter 21, section 21.5.1; Chapter 35, section 35.11.4.

#	Proponent commitment	EIS reference
216	After final impact and ecological equivalence methodology (EEM) calculations of the impact sites, non-development areas on proponent related tenements and properties will be assessed and utilised initially for offset supply. Subsequent to this, approaches will be made to landholders with potential offset sites to participate in the offset package.	Chapter 21, sections 21.5.2 and 21.5.3; Chapter 35, sections 35.11.4.2 and 35.11.4.3.
217	It is proposed that the proponent will enter into a Deed of Agreement (DOA) for the life of the project with DEHP. Within twelve months (12 months) from the date that the DOA is signed by both parties, the proponent will submit, for approval, the offset package for the first 10 years of impact, which includes signed mechanisms to legally secure the offsets for the disturbance incurred, in a manner that meets the requirements set out in the EOP.	Chapter 21, section 21.5.4; Chapter 35, section 35.11.4.4.
218	All direct offset sites will be secured using one of the legally binding mechanisms on Title that are available to ensure the protection of the offset and implementation of the Offset Area Management Plans (OAMP). These legally binding mechanisms are: • gazettal as a protected area (e.g. a nature refuge) under the NC Act • declaration of an area of high nature conservation value under the VM Act • use of a covenant under the *Land Title Act 1994* or *Land Act 1994*. • The mechanisms adopted to secure offsets will ultimately depend upon the mechanisms available and agreed to by the relevant parties.	Chapter 21, sections 21.7.1 and 21.7.2; Chapter 35, sections 35.11.6 and 35.11.6.2
219	Each OAMP will contain an estimate of the costs of management and the reporting and monitoring program that will extend until the management outcomes are achieved or the expiration of the EA, whichever occurs first. Management actions recommended could include: • management of grazing • weed management • feral pest management • management of fire • if applicable, active revegetation. The length of active management will be influenced by the condition of vegetation, type of habitat and vegetation on site, as well as existing management issues.	Chapter 21, section 21.7.2; Chapter 35, section 35.11.6.2.
220	Meteorological and dust monitoring will be implemented to identify the potential for exceedances of air quality objectives resulting in the staged implementation of additional dust mitigation measures described below. In addition to monitoring dust, local meteorological data will be collected from a monitoring station installed on the project area and situated close to the administration area. This station will collect temperature, relative humidity, rainfall and wind data over the life of the project.	Chapter 22, section 22.7.1.
221	A network of dust deposition gauges will be installed at all sensitive receptors surrounding the project. Dust deposition (fallout) monitoring will commence prior to mining operations and continue for the life of the project.	Chapter 22, section 22.7.1.1.
222	More frequent monitoring of dust will be undertaken at Receptor 5 with a monitoring station permanently installed close to the homestead.	Chapter 22, section 22.7.1.2.

#	Proponent commitment	EIS reference
223	A Dust Management Plan will be developed and include an action response plan to mitigate adverse air quality impacts. The Dust Management Plan will address the sequential and incremental adoption of dust mitigation measures in response to adverse meteorological conditions, seasonal effects and monitored dust levels. When required, these mitigation measures will be followed by a reduction in operational activities at appropriate pits and locations on the basis of ongoing monitoring of dust levels at receptor 5. A series of sequential dust mitigation measures (as modelled for Year 36) will be sequentially adopted as required, to ensure that the project can achieve compliance with the 5th highest PM_{10} (24 hour) objective (at receptor 5).	Chapter 22, section 22.7.4.
224	The proponent is committed to monitor, audit and report on greenhouse gas (GHG) emissions from all relevant activities as is required.	Chapter 23, section 23.6.
225	The proponent is committed to sustainable development and reducing the GHG emissions of its operations, accelerating the uptake of energy efficiency, integrating GHG issues into business decision making and providing more consistent reporting of GHG emissions.	Chapter 23, section 23.6.
226	The following GHG minimisation strategies may be implemented where practicable for equipment purchase and energy efficiency: • An energy efficiency audit will be undertaken, where appropriate, during the detailed design phase. • The use of high efficiency electrical motors throughout the mine site and the use of variable speed drive pumps with high efficiency linings at the CHPPs will be considered and implemented where practicable • The proponent will investigate the use of natural gas as a fuel alternative to diesel for mining equipment. • Select fuel efficient motors. • Install light sensitive switches on lighting equipment and energy efficient light bulbs throughout the project site where practicable. • Install energy saving devices within the on-site buildings, where practicable.	Chapter 23, section 23.6.

#	Proponent commitment	EIS reference
227	The following GHG minimisation strategies may be implemented where practicable for mine planning: • Haul truck scheduling, routing and idling times will be optimised to minimise the amount of diesel consumed. • Pit access ramps will be designed to limit the amount of effort required for fully-laden trucks to climb. • Haul roads will be compacted to reduce rolling distance. • The location of run of mine (ROM) coal pads and waste rock dumps will be optimised during detailed design, to limit the amount of distance haul trucks need to cover whilst heavily laden. • A mining method will be adopted that uses large equipment and economies of scale to significantly reduce GHG emissions. • Coal and waste rock will be extracted and transported efficiently thereby minimising the number of trips and fuel consumption. • Blasting will be designed to be efficient. • Refrigerants in equipment and air conditioning will be recycled. • Waste will be segregated into recycling and general waste. • Vegetation will not be burned.	Chapter 23, section 23.6.
228	The following GHG minimisation strategies may be implemented where practicable for auditing and management: • Periodic energy audits will be conducted. Auditing will include benchmarking studies to allow mine performance relative to industry standards for energy use and where the mine is not achieving these standards, programs will be implemented to achieve reductions. The results of audits will be used to identify means for continual reductions in GHG emissions. • Energy efficiency awareness training will be part of inductions. • An inventory of emissions and GHG sinks will be developed and maintained. • New technologies, with the potential to reduce emissions and energy use, will be reviewed over the life of the project.	Chapter 23, section 23.6.
229	If blasting encroaches within one km of the infrastructure, the blast vibrations will be monitored to demonstrate compliance.	Chapter 24, section 24.6.5.
230	The project will limit blasting to the hours of 9 am to 3 pm, Monday to Friday, and from 9 am to 1 pm on Saturdays unless there is no likelihood of persons in a noise-sensitive place being affected because of the remote location of the blast site.	Chapter 24, section 24.7.
231	Lighting will be designed to ensure any impact to surrounding viewpoints is minimised.	Chapter 25, section 25.5.3.
232	Infrastructure will generally be removed, depending upon post-mining land uses and the specific infrastructure type considered.	Chapter 25, section 25.7.
233	The project has been designed and will be constructed to minimise the use of resources and generation of wastes throughout all phases of the project and to ensure compliance with the relevant legislation relating to waste.	Chapter 26, section 26.1.
234	During the project construction, operation and decommissioning, waste will be managed to avoid adverse impacts on the health and wellbeing of the local community and the surrounding environment.	Chapter 26, section 26.2.

#	Proponent commitment	EIS reference
235	A Waste Management Plan will be developed that will include schematic diagrams of processes to be used at each distinct stage of the project, indicating each waste stream and its intended fate.	Chapter 26, section 26.3.1.
236	If emptying of sediment ponds is required during construction then sediment will be dried and re-used on site.	Chapter 26, section 26.3.3.
237	Design will aim to balance cut / fill volumes. Excess spoil from construction of TLFs (excluding topsoil) will be used to refill excavations and construct haul roads, pads etc. If necessary excess spoil from construction of TLFs (excluding topsoil) will be stockpiled or spread for use in revegetation works.	Chapter 26, section 26.3.3.
238	Scrap metal will be minimised by ordering what is required. Scrap metal will be store in designated areas for collection by a waste contractor for off-site recycling.	Chapter 26, section 26.3.3.
239	Concrete waste will be minimised by producing only the amount necessary. Alternative pour areas will be prepared for surplus quantities. If possible concrete waste will be crushed and re-used for road base or disposed of in waste rock dumps.	Chapter 26, section 26.3.3.
240	Timber waste will be minimised by ordering what is required. If possible, good pallets will be returned to sender. Timber and waste will be chipped and re-used on site as mulch for landscaping. If not suitable timber waste will be dumped on site.	Chapter 26, section 26.3.3.
241	Building and construction waste will be minimised by ordering what is required. Building and construction material that is not needed will be returned to the supplier where possible. Building and storage waste will be stored in a designated area for collection by a licensed waste contractor, to be recycled where commercially viable or disposed of at a licensed waste facility.	Chapter 26, section 26.3.3.
242	Paints and resins, chemicals such as herbicides and chemical container waste will be minimised by ordering what is required. Paints and resins, chemicals such as herbicides and chemical container waste will be stored in designated area for collection by a licensed waste contractor and disposed of off-site by a licensed waste receiver. Paints and resins, chemicals such as herbicides and chemical container waste will comply with requirements of material safety data sheets (MSDS).	Chapter 26, section 26.3.3.
243	Waste air filters, oil filters, batteries will be stored in a designated area on site until there are sufficient to be collected by a licensed waste contractor for recycling off-site.	Chapter 26, section 26.3.3.
244	Scrap tyres will be collected and stored in designated area as per the DERM (now DEHP) Operational Policy – Disposal and storage of scrap tyres at mine sites. Tyres will be repaired and re-used where possible. Where possible, take-back agreement will be negotiated with tyre supplier. Any on-site disposal of tyres will follow the operational policy after considering any recycling options.	Chapter 26, section 26.3.3.
245	At the decommissioning phase of the project, a comprehensive assessment of waste will be undertaken in accordance with the waste management hierarchy in order to identify the most appropriate measures to manage the remaining waste on the project site.	Chapter 26, section 26.3.5.
246	Site infrastructure will generally be decommissioned and demolished in line with the post mine land use.	Chapter 26, section 26.3.5.

#	Proponent commitment	EIS reference
247	Any construction facilities that are decommissioned following construction phases will be managed in accordance with the waste management hierarchy and the controls described above for construction wastes.	Chapter 26, section 26.3.5.
248	A detailed Waste Management Plan will be developed for the project that defines and describes the objectives and measures for protecting or enhancing environmental values from impacts by waste. The management measures will be assessed against the waste hierarchy, and describe how the measures will achieve the standards, set and detail objectives that will be monitored, audited and managed.	Chapter 26, sections 26.4.2, 26.5.2 and 26.6.
249	The scope of the Waste Management Plan will address the management of construction and operational wastes including storage, transport and disposal. The plan will address the principles of avoid, re-use, recycle, recover and disposal and include proposed methods for waste management at each stage of the project to achieve the highest possible level on the waste management hierarchy taking into consideration the Environmental Protection (Waste Management) Policy 2000.	Chapter 26, sections 26.4.2 and 26.5.2.
250	Implementation of the Waste Management Plan will be monitored on a regular basis via the project site inspection and auditing requirements.	Chapter 26, section 26.4.2.
251	Investigations regarding waste re-use will be ongoing throughout the project life.	Chapter 26, section 26.4.4.2.
252	Waste recycling will be used on-site wherever practicable.	Chapter 26, section 26.4.4.3.
253	General waste will be transported to a local landfill for disposal in accordance with regulatory requirements.	Chapter 26, section 26.4.4.4.
254	The potential impacts of waste disposal in the open pits will further analysed as the requirements are better defined and waste will not be disposed of in the open pit where there is a risk of ongoing contamination of waters.	Chapter 26, section 26.4.4.4.
255	Decant water from the co-disposal storage facilities will be re-used in the CHPP and, depending on water quality, used for dust suppression and vehicle washdowns.	Chapter 26, section 26.4.6.
256	The waste storage areas will be bunded or have a suitable containment system in place for the type of waste to be stored. The containment systems will ensure wastes are contained and do not cause environmental harm including surface water and groundwater contamination.	Chapter 26, section 26.5.2.
257	A separate hazardous waste storage area will be available to ensure that any hazardous waste is managed to prevent environmental harm.	Chapter 26, section 26.5.2.
258	A register will be developed and maintained for all regulated wastes generated on site. It will include the following details: source of waste; type of waste; quantity of waste; storage location and details; dates of collection; date of disposal/recycling; name and details (including licencing details) of transporter and facility used to dispose the waste. The relevant EHP forms will be completed in line with the requirement under the Environmental Protection (Waste Management) Regulation 2000.	Chapter 26, sections 26.5.4.
259	Waste streams, quantities and waste management practices will be audited during the construction and operational phases of the project.	Chapter 26, section 26.5.5.

#	Proponent commitment	EIS reference
260	The proponent will continue to work with DTMR and local road authorities to identify vulnerable bridges and structures.	Chapter 27, section 27.4.1.6.
261	The proponent will provide bus transport to and from regional centres, which will include provision for transport of workers with a disability.	Chapter 27, section 27.5.4.
262	The location of access intersections for the mine site on Collinsville-Elphinstone Rd will be selected based on minimising the impact on the safety, operation, and efficiency of the road network.	Chapter 27, section 27.7.6.
263	The crossing of the Newlands Rail System will be designed in accordance with the relevant standards and guidelines. Any assessment including an Australian Level Crossing Assessment Model will be undertaken as part of the permit requirements for the level crossing through the relevant authority.	Chapter 27, section 27.7.8; Chapter 34, section 34.17.1.
264	The intersection of the haul roads with Xstrata's mining lease for transport will be designed in accordance with the relevant design guidelines and standards including turn paths/swept path of the appropriate vehicles and ensure that appropriate sight lines and distances are provided to ensure safe operation of the intersection.	Chapter 27, section 27.7.8; Chapter 34, section 34.17.1.
265	Load covers will be required on any heavy vehicles carrying material that has the potential to generate dust along public roads to or from the project site.	Chapter 27, section 27.7.10.
266	Adequate standard operating procedures, roster control and fatigue management guidelines will be developed in accordance with the *Coal Mine Safety and Health Act 1999* and assist in minimising and reducing the risk of driver fatigue. These will be in addition to the statutory guidelines set by DTMR for Queensland.	Chapter 27, section 27.7.11; Chapter 33, section 33.4.5.
267	Driver fatigue management procedures will be implemented for all workers traveling to and from regional centres.	Chapter 27, section 27.7.11; Chapter 33, section 33.4.5.
268	The proponent will comply with all requirements for the transport of dangerous goods and hazardous materials, including requirements under the Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008 and the Transport Infrastructure (Dangerous Goods by Rail) Regulation 2008.	Chapter 8, section 8.3.1; Chapter 27, section 27.7.12.
269	A spillage action plan and procedure (for hazardous and dangerous goods) will be developed for the project site to minimise potential health and safety implications from exposure and to mitigate and reduce the potential impact on the surrounding environment.	Chapter 27, section 27.7.13; Chapter 15, section 15.7.3.
270	Security controls will be installed on the site access roads to the northern and southern project areas and fencing will be provided at necessary locations adjacent to roadways and rail corridors.	Chapter 27, section 27.7.14.
271	Signage will be installed to discourage access from public roads to the project area.	Chapter 27, section 27.7.14.
272	The proponent will consult emergency services about appropriate design of site access roads.	Chapter 27, section 27.7.14.
273	The road use management plan will be developed to minimise the impacts of the mine on the state-controlled road network. This document will include: objectives; strategies (e.g. dangerous goods or over dimension vehicle transportation); monitoring required throughout the project life; corrective actions required; continual report and updating.	Chapter 14, section 14.6.5.1; Chapter 27, section 27.7.15.

#	Proponent commitment	EIS reference
274	The proponent will comply with all relevant traffic and transport regulations and establish project specific procedures for road safety, road use management, transport of dangerous goods and hazardous substances and traffic management.	Chapter 27, section 27.8.
275	Cultural Heritage Management Plans (CHMPs) with the relevant Aboriginal parties for the project area have been developed and approved. The CHMPs are being implemented and will be used to manage indigenous cultural heritage for this project.	Chapter 28, section 28.1.
276	In accordance with both CHMPs, field surveys will be conducted prior to any ground disturbing activities.	Chapter 28, section 28.3.3.
277	In order to measure the extent to which these objectives are met, the following performance indicators will be applied: • compliance with the ACH Act is achieved throughout all three phases of the project (construction, operation and decommissioning) • avoid disturbance of known cultural heritage values caused by project activities, or, where this is not possible, manage disturbances in accordance with the relevant CHMP • procedures for identifying and managing identified and potential heritage values are implemented successfully.	Chapter 28, section 28.8.
278	Augmenting the process and procedures established in the CHMPs, audits of the management of any discoveries of cultural heritage significance will be conducted by the proponent after any discovery and at regular intervals during the development and implementation of a management plan to assess whether: • the discovery was reported and managed in accordance with the ACH Act; records of all relevant correspondence and forms were maintained • the discovery was protected during the preparation of a management plan; all management options were considered in consultation with relevant stakeholders, including DATSIMA and an appropriate management plan developed • procedures implemented under the relevant CHMP sufficiently managed the item, place or area to prevent negatively impacting cultural heritage values • the item, place or area has not been negatively impacted by project activities.	Chapter 28, section 28.9.1.
279	Where predictive modelling indicates that there is a higher likelihood of discovering historical cultural heritage sites, persons undertaking activities in those areas will be briefed through, for example, site inductions or toolbox talks. If required, further field surveys will be undertaken.	Chapter 29, section 29.5.2.
280	If a project activity is anticipated to occur within 300 m of a known cultural heritage value, then a site-specific survey by a suitably qualified person will be undertaken, resulting in the preparation of site-specific management strategies upon discovery of significant cultural heritage values.	Chapter 29, section 29.5.2.
281	Project works will avoid the known heritage values wherever possible. Known heritage values will be included in exclusion-zone mapping with fencing or pegging of the area if required.	Chapter 29, section 29.6.1.

#	Proponent commitment	EIS reference
282	In the event project activity is anticipated to occur within 300 m of the drovers' and ringers' camp site a management plan will be prepared for this site.	Chapter 29, section 29.6.1.
283	In the event heritage values are discovered during project activities, an assessment by a suitably qualified person will be conducted to determine the best management strategy for the site and to prepare a site-specific management plan if required.	Chapter 29, section 29.6.2.
284	A plain English training manual on managing cultural heritage will be developed and provided to all site workers for their reference.	Chapter 29, section 29.6.3.
285	Audits of the management of any discoveries of significant historical cultural heritage (as determined by a suitably qualified person) will be conducted by the proponent after any discovery and at regular intervals during the development and implementation of a management plan to assess whether: the discovery was reported and managed in accordance with s.89 of the QH Act; records of all relevant correspondence and forms is maintained; the discovery was protected during the preparation of a management plan; all management options were considered in consultation with relevant stakeholders, including DEHP and an appropriate management plan developed; the management plan implemented sufficiently managed the item, place or area to prevent negatively impacting historical cultural heritage values; the item, place or area has not been negatively impacted by project activities.	Chapter 29, section 29.7.
286	The proponent will devise a number of strategies to mitigate for above average seasonal wet weather and any potential impacts this may have on the production and delivery of the mine's coal. During construction, this may include: developing a construction program with delay contingencies around expected wet weather periods; utilising construction techniques that, in the case of severe rainfall, will not significantly hamper the completion of the project. During operations, this may include advanced planning of production and transporting schedules to prepare for expected wet seasons.	Chapter 30, section 30.5.7.
287	The Workforce Accommodation Strategy developed for the project will be implemented based on the following guidelines: Byerwen Coal will secure land in Glenden for the facilities and ensure the development meets the required local government approval requirements; facilities will be of a standard commensurate with other facilities in the Bowen Basin; Byerwen Coal will select partners based on financial capacity and experience in design, construction and operation of similar facilities in the Bowen Basin; Byerwen Coal will appoint facility operators to manage and maintain the facilities to meet all relevant industry standards; Byerwen Coal is seeking to acquire sufficient land in Glenden so that there is flexibility and the ability to respond rapidly to changing demands for the quantity and style of housing. If sufficient land in Glenden is unable to be acquired, accommodation will be provided at an alternative location outside of Glenden such as on or near the mining lease.	Chapter 31, section 31.3.4.
288	Employment opportunities will be open to local residents in Glenden.	Chapter 31, section 31.4.1.2.
289	For those properties within the project area but not directly within the project footprint, Byerwen Coal will negotiate compensation arrangements with these landholders, if required.	Chapter 31, sections 31.2.6 and 31.4.2; Chapter 34, section 34.4.

#	Proponent commitment	EIS reference
290	QCoal is committed to the health of the communities in which it operates and will continue to engage with health care and emergency service providers in Glenden and surrounding areas to understand arising issues and strategies to address them.	Chapter 31, section 31.5.1.2.
291	The QCoal Foundation, which will incorporate the Sonoma grants program and other giving initiatives, will provide financial contributions to improve and assist community services in the region. A budget in line with the level of contribution associated with Sonoma Mine will be set for the Glenden component of the QCoal Foundation's grants program once the project is approved.	Chapter 31, sections 31.5.1.3, 31.5.5.2, 31.5.5.9 and 31.5.5.10.
292	QCoal will generate new opportunities to assist with skills development, such as educational bursaries though its community grants program.	Chapter 31, sections, 31.5.1.3 and 31.5.2.
293	Only contractors with a commitment to implementing skills and training programs will be considered in the selection for project operations.	Chapter 31, section 31.5.2
294	QCoal's contractors employ the majority of the workforces and they will develop workforce management plans to outline their approach to workforce recruitment and management.	Chapter 31, section 31.5.2
295	Byerwen Coal intends to provide a range of accommodation options so that the workers have a genuine choice of where they would like to live – either locally or remotely in which case they will be able travel in and out of town for their shift rosters.	Chapter 31, sections 31.5.3.1 and 31.4.1.2.
296	Byerwen Coal's contractors will ensure relevant organisations such as Skills Queensland, Whitsunday Marketing and Development (WM&D), fly-in fly-out (FIFO) coordinators and employment agencies have access to workforce profile information such as that contained within the EIS and will continue to liaise about other opportunities that could be developed to achieve a higher proportion of local and regional employees.	Chapter 31, section 31.5.3.
297	Byerwen Coal will encourage its contractors to be culturally sensitive in terms of communication and process to the recruitment of indigenous people and to mentor, up-skill and retain indigenous employees.	Chapter 31, section 31.5.3.2.
298	Byerwen Coal will require that the principal mining contractor provides the opportunity for two indigenous people to be employed at the project as well as adhere to the commitments set out in the Cultural Heritage Management Plans (CHMPs).	Chapter 31, section 31.5.3.2.
299	Byerwen Coal will continue to work in collaboration with relevant traditional owners to increase the number of indigenous workers at the mine and will establish a revised employment target once the mine is operational.	Chapter 31, section 31.5.3.2.
300	Byerwen Coal will establish an employment target for women once the mine is operational.	Chapter 31, section 31.5.3.3.
301	Byerwen Coal will encourage its contractors to liaise with disability employment organisations to assist job seekers with disabilities, learning difficulties, injury or medical condition gain employment at the mine.	Chapter 31, section 31.5.3.4.
302	A code of conduct will be developed for both the construction and operational workforce.	Chapter 31, sections 31.5.3.5 and 31.5.5.5.

#	Proponent commitment	EIS reference
303	In addition to contractor responsibilities QCoal will support programs that address needs of the workers and their families who may choose to relocate to live locally.	Chapter 31, section 31.5.3.6.
304	Byerwen Coal will maintain regular liaison with educational and training organisations about future workforce requirements to assist them in shaping their programs to respond to demand.	Chapter 31, section 31.5.3.7 and 31.5.5.7.
305	The principal mining contractor will be required to: maintain regular contact with organisers of training programs for up-skilling workforce, obtaining appropriate health and safety education and appropriate certification; provide the opportunity for at least two apprentices per year across their operations; provide employee induction and toolbox meetings (covering aspects of worker behaviour, company expectations, community perceptions of behaviour, health record.).	Chapter 31, section 31.5.3.7.
306	Byerwen Coal will aim to support trainees and graduate students in its operations as well as offer a target of two education grants per year for tertiary studies.	Chapter 31, section 31.5.3.7.
307	Along with increased local and regional employment opportunities the project will also provide local and regional business the opportunity to supply goods and services to construction and operations contractors.	Chapter 31, section 31.5.4.
308	QCoal encourages its contractors to maximise local industry participation and give preference to suppliers of Australian-manufactured equipment that is competitively priced and complies with the relevant standards and specifications via best practice approaches.	Chapter 31, section 31.5.4.1.
309	Byerwen Coal will source contractors in line with its Australian Industry Participation Policy to construct and operate the mine and coal handling and preparation plant.	Chapter 31, section 31.5.4.1.
310	Contractors will be required to outline how they will source sub-contractors with a focus on local and regional suppliers as part of the tendering process.	Chapter 31, section 31.5.4.1.
311	Byerwen Coal and/or its contractors will implement procurement procedures to include the following provisions: promote supply opportunities to suppliers within the region and provide local industry with full, fair and reasonable opportunity to provide goods and services; liaise with Industry Capability Network (ICN) Gateway and Whitsunday Industrial Workforce Development (WIWD) program to identify pre-qualified suppliers and to provide them the opportunity to submit expressions of interest and/or tenders; promote the ICN Gateway and WIWD to local and regional suppliers; provide notification of work packages to ICN Gateway and WIWD as they become available; provide project progress updates to local and regional suppliers via email updates and presentations to industry groups (such as MAIN, Major Projects Summit, MESCA); continue to support economic development initiatives and work with relevant organisations that assist local businesses to identify and prepare for business opportunities; monitor and evaluate the effectiveness of the program through a count of the number of suppliers from the local and regional areas.	Chapter 31, section 31.5.4.1.
312	Byerwen Coal's construction and mining contractors' contract documents will include the Environmental Authority, the SIMP and the relevant CHMP.	Chapter 31, section 31.5.4.4.

#	Proponent commitment	EIS reference
313	The potential diminishment in local residents' sense of rural and agricultural value and identity will be mitigated via a Social Identity and Cohesion and Health and Community Infrastructure Action Plan included as part of the SIMP.	Chapter 31, section 31.5.5.2
314	The potential loss or destruction of items or areas of indigenous heritage value will be mitigated by the implementation of CHMPs as well as a cultural awareness program as part of the Induction program for relevant staff and contractors to the project, and a chance finds protocol to manage new finds or human remains.	Chapter 31, section 31.5.5.3.
315	A Byerwen Coal bursary program has been established to support educational goals of Jangga students, with two students currently studying under the Byerwen Coal bursary program. A target of four bursaries will be awarded through this program each year.	Chapter 31, section 31.5.5.3.
316	QCoal will also implement their Workforce Accommodation Strategy, which includes formulation and application of a Glenden Urban Design Master Plan that provides the blueprint for residential growth and development in Glenden.	Chapter 31, section 31.5.5.5.
317	A code of conduct will also be developed for the project workforce and will be linked to employee contract conditions. QCoal will also encourage integration of the workforce into the community through involvement and participation programs.	Chapter 31, section 31.5.5.5.
318	QCoal will work to mitigate the negative impacts associated with regional skills shortages via the implementation of a rigorous contractor selection process, assistance with skills development through provision of information to Skills Queensland and the promotion of employment opportunities.	Chapter 31, section 31.5.5.6.
319	Byerwen Coal will consult with stakeholders to gather relevant data and feedback and will rely on Byerwen Coal and contractor internal management systems (such as human resources, safety and health) for the collection of data. Byerwen Coal will collate and report on the data collected.	Chapter 31, section 31.7.1.
320	Action plans outlined in the SIMP will be monitored to determine whether the actions contained therein are meeting the identified objectives.	Chapter 31, section 31.7.
321	External reporting during construction will take place via an annual report on progress against the SIMP, which will be submitted to key stakeholders and the community of Glenden.	Chapter 31, section 31.7.2.
322	The reporting regime during operations will be agreed with Queensland Government during the approval process.	Chapter 31, section 31.7.2.
323	Internal review of the project's SIMP will take place annually in consultation with the Isaac Regional Council, Whitsunday Regional Council, the Mackay Regional Council, Queensland Government's SIA Unit and selected key community stakeholders.	Chapter 31, section 31.7.3.
324	A final review will occur 12 months in advance of the commencement of the closure/decommissioning of the project.	Chapter 31, section 31.7.3.
325	External review will involve the commissioning of a third-party independent company or chairperson, who will audit the SIMP process undertaken to date, and will also report on progress against key performance indicators and targets.	Chapter 31, section 31.7.3.

#	Proponent commitment	EIS reference
326	Amendments and updates to the SIMP will be made if the strategies and actions described in the original SIMP no longer meet the desired outcomes, or if improvements to existing measures can be made. Amendments and updates will occur during the regular review process.	Chapter 31, section 31.7.3.
327	Any proposal to amend the SIMP will be subject to negotiation between Byerwen Coal and the Queensland Government's SIA Unit. Amendments and updates will be communicated to key stakeholders for the project through existing community consultation mechanisms.	Chapter 31, section 31.7.3.
328	Health and safety hazards that are likely to be present in normal on-site day-to-day activities during construction and operation of the project are well addressed in workplace health and safety legislation and relevant standards and will be complied with at all times during the construction, operation and decommissioning of the project.	Chapter 32, section 32.3.1.
329	Manual handling hazard will be mitigated through the following risk treatment measures - use approved safe work method, training and competency assessment, provide equipment fit for purpose and suitable allocation of resources.	Chapter 32, section 32.3.1.
330	Slips and trips hazard will be mitigated through the following risk treatment measures - use approved safe work method, training and competency assessment.	Chapter 32, section 32.3.1.
331	Hazards relating to interaction with mobile equipment will be mitigated through the following risk treatment measures - training, competency assessment, systems of authorisations, inspections, signage, traffic management plan, "no go" zones, dedicated pedestrian walkways.	Chapter 32, section 32.3.1.
332	Hazards relating to working at heights will be mitigated through the following risk treatment measures -training, competency, appropriate scaffolding and/or personal protective equipment (PPE), inspections, safe work methods.	Chapter 32, section 32.3.1.
333	Hazards relating to working with electrical equipment will be mitigated through the following risk treatment measures – qualified electricians, training, competency, approved safe work methods, equipment maintenance, testing and tagging procedures, inspections, separate / barricade work areas, isolation permit system.	Chapter 32, section 32.3.1.
334	Hazards relating to equipment with moving parts will be mitigated through the following risk treatment measures – isolation procedures, tag protection system, maintenance of guarding, inspections, training, competency.	Chapter 32, section 32.3.1.
335	Hazards relating to falling objects will be mitigated through the following risk treatment measures – PPE, barricading, approved safe work methods.	Chapter 32, section 32.3.1.
336	Hazards relating to fatigue will be mitigated through the following risk treatment measures – fit for work program, fatigue management plan, traffic plan.	Chapter 32, section 32.3.1.
337	Hazards relating to confined space will be mitigated through the following risk treatment measures – confined space permits, training, competency, approved safe work method statement, equipment serviced regularly.	Chapter 32, section 32.3.1.
338	Hazards relating to pinch points will be mitigated through the following risk treatment measures – safe work methods, training, competency, guarding, barricading, signage.	Chapter 32, section 32.3.1.

#	Proponent commitment	EIS reference
339	Hazards relating to lightning will be mitigated through the following risk treatment measures – storm procedures, approved safe work methods, lightning masts.	Chapter 32, section 32.3.1.
340	Wildlife hazards will be mitigated through the following risk treatment measures – PPE for example, long trousers, high sided safety boots, first aid training, emergency management plan.	Chapter 32, section 32.3.1.
341	Hazards relating to disease vectors will be mitigated through the following risk treatment measures – PPE for example, long trousers, long shirts, insect repellent where required. Water bodies, including dams, managed to avoid stagnation hence minimising potential for mosquito breeding sites.	Chapter 32, section 32.3.1.
342	Hazards relating to dust will be mitigated through the following risk treatment measures – watering roads, dust suppression, PPE.	Chapter 32, section 32.3.1.
343	Hazards relating to noise will be mitigated through the following risk treatment measures – PPE, noise barriers, equipment location.	Chapter 32, section 32.3.1.
344	Hazards relating to sunburn will be mitigated through the following risk treatment measures – PPE, provision of sunscreen.	Chapter 32, section 32.3.1.
345	Hazards relating to dehydration/heat stress will be mitigated through the following risk treatment measures – PPE, safe work method statement, provide water, training.	Chapter 32, section 32.3.1.
346	Hazards relating to welding and cutting will be mitigated through the following risk treatment measures – PPE, safe work method statement, qualifications.	Chapter 32, section 32.3.1.
347	Hazards relating to exposure to hazardous substances will be mitigated through the following risk treatment measures – PPE, training, MSDS, standards and procedures for transporting, handling, using and disposing of hazardous substances.	Chapter 32, section 32.3.1.
348	Hazards relating to fire will be mitigated through the following risk treatment measures – emergency exits, training, Emergency Management Plan, fire extinguishers, fire alarms.	Chapter 32, section 32.3.1.
349	MSDS will be available on site where hazardous substances are to be stored or used.	Chapter 32, section 32.3.2.
350	Hazards relating to transporting personnel, equipment and materials to and from the site and within site will be mitigated through the following risk treatment measures – secure loading of materials, procedures, training, spill management, Emergency Management Plan, speed limits, paving, watering roads, wind breaks.	Chapter 15, section 15.7.3; Chapter 26, section 26.5.3; Chapter 32, section 32.5.
351	Hazards relating to the transport of fuel and explosives to and within site will be mitigated through the following risk treatment measures – speed limits, traffic management plan, transport in accordance with relevant standards, training, Emergency Management Plan.	Chapter 32, section 32.5.
352	Hazards relating to the storage of fuel will be mitigated through the following risk treatment measures – Fuel storage designed and operated in accordance with AS1940, bunds, signage, spill procedures, emergency response planning, training, inspection and maintenance program.	Chapter 32, section 32.5.

#	Proponent commitment	EIS reference
353	Hazards relating to the storage of explosives will be mitigated through the following risk treatment measures – management of blasting and handling of explosives in accordance with Australian Standards and Regulations; explosives management plan including maintenance of a blasting exclusion zone and appropriate signage; licensed, trained, experienced competent personnel, Emergency Management Plan.	Chapter 32, section 32.5.
354	Hazards relating to clearing and earthworks will be mitigated through the following risk treatment measures – speed limits, paving, watering roads, wind breaks, erosion and sediment control plan include diversion and management of water runoff and progressive stabilisation, awareness of site personnel regarding hazards and Emergency Response Plan.	Chapter 32, section 32.5.
355	Hazards relating to construction and installation of infrastructure will be mitigated through the following risk treatment measures – staff training, procedures relating to controlling sources of ignition, Emergency Response Plan, speed limits, paving, watering roads, wind breaks, erosion and sediment control plan including diversion and management of water runoff and progressive stabilisation, traffic management plan.	Chapter 32, section 32.5.
356	Hazards relating to topsoil stripping and storage will be mitigated through the following risk treatment measures – speed limits, paving, watering roads, wind breaks, erosion and sediment control plan include diversion and management of water runoff and progressive stabilisation, awareness of site personnel regarding hazards, Emergency Response Plan.	Chapter 32, section 32.5.
357	Hazards relating to blasting will be mitigated through the following risk treatment measures – management of blasting and handling of explosives in accordance with Australian Standards and Regulations, explosives management plan including maintenance of a blasting exclusion zone and appropriate signage, licensed, trained, experienced competent personnel, dust control measures and monitoring, explosives management plan, training.	Chapter 32, section 32.5.
358	Hazards relating to the removal of waste rock will be mitigated through the following risk treatment measures – dust controls procedures, monitoring, mine plan, surveys, inspections.	Chapter 32, section 32.5.
359	Hazards relating to waste rock dump operation will be mitigated through the following risk treatment measures – speed limits, paving, watering roads, wind breaks, mine plan, waste rock management plan, surveys, inspections.	Chapter 32, section 32.5.
360	Hazards relating to hauling ROM coal will be mitigated through the following risk treatment measures – road design, signage, speed limits, vehicle maintenance, roll over bars, fitness for work, training, traffic management, dust control measures and monitoring.	Chapter 32, section 32.5.
361	Hazards relating to CHPP facilities including crushing, screening, processing, blending, washing will be mitigated through the following risk treatment measures – dust control procedures and monitoring, fire breaks maintained, control of ignition sources via procedures and training, watering, equipment available to rapidly manage stockpiles, Emergency Management Plan, training, bunding equipment and material, location of CHPP away from potential to enter watercourses, spills procedure, Emergency Management Plan, training, inspection and maintenance programs.	Chapter 32, section 32.5.

#	Proponent commitment	EIS reference
362	Hazards relating to coal stockpiling and handling at train loading facilities will be mitigated through the following risk treatment measures – dust control measures, monitoring, fire breaks maintained, control of ignition sources via procedures and training, watering, equipment available to rapidly manage stockpiles, Emergency Management Plan, training.	Chapter 32, section 32.5.
363	Hazards relating to product coal transport – rail loop and rail spur will be mitigated through the following risk treatment measures – fire breaks maintained around the activity area including the conveyor to the train loading bin, control of ignition sources via procedures and training, Emergency Management Plan, training, exclusion of public, dedicated crossing points for landholders, cattle grids, dust control measures, cover conveyor, spill trays, monitoring, traffic control measures, traffic management plan.	Chapter 32, section 32.5.
364	Hazards relating to earthworks and re-contouring of excavated surfaces and spoil dumps will be mitigated through the following risk treatment measures – Final Void Plan to be developed and implemented progressively through the life of the mine to ensure geotechnical stability, void stability, management of water quality, rehabilitation taking into account native flora and fauna.	Chapter 32, section 32.5.
365	Hazards relating to management of mine affected waters – collection, storage and disposal will be mitigated through the following risk treatment measures – appropriate design, procedures, training, inspection and maintenance, emergency procedures for unplanned releases, design and construction of dam in accordance with required standards, routine inspections and monitoring.	Chapter 32, section 32.5.
366	Hazards relating to waste management (solid) – storage, transfer and disposal will be mitigated through the following risk treatment measures – appropriate design and distance from ML boundary, procedures, training, inspection and maintenance.	Chapter 32, section 32.5.
367	Hazards relating to management of rejects, including co-disposal dams reject water, will be mitigated through the following risk treatment measures – bunding equipment and material, location of CHPP away from potential to enter watercourses, spills procedure, Emergency Management Plan, training, inspection and maintenance programs, design and construction of dam in accordance with required standards, routine inspections, Emergency Management Plan training, mosquito control plan, inspections and monitoring.	Chapter 32, section 32.5.
368	Hazards relating to road maintenance – internal and external will be mitigated through the following risk treatment measures – dust control measures and monitoring.	Chapter 32, section 32.5.
369	Hazards relating to water infrastructure will be mitigated through the following risk treatment measures – appropriate design, inspection and maintenance.	Chapter 32, section 32.5.
370	Hazards relating to remediation of contaminated land will be mitigated through the following risk treatment measures – all contaminated land will be remediated prior to mine closure and surrender of land (for example, soil quality investigation and remediation will be undertaken in accordance with DEHP Guidelines for Contaminated Land).	Chapter 32, section 32.5.

#	Proponent commitment	EIS reference
371	Hazards relating to demolition and the remediation of co-disposal dam will be mitigated through the following risk treatment measures – rehabilitate dam area; cap surface with benign overburden material to prevent water ingress; vegetate in accordance with the rehabilitation plan; register the site on the Environmental Management Register and the Contaminated Land Register with DEHP; implement Site Management Plan.	Chapter 32, section 32.5.
372	Hazards relating to the final void will be mitigated through the following risk treatment measures – maintenance of bunding and fencing and signage to prevent trespassing.	Chapter 32, section 32.5.
373	Hazards relating to the external factors including sabotage, protest and disease outbreak will be mitigated through the following risk treatment measures – security management plan, fencing, site hygiene standards, Emergency Management Plan.	Chapter 32, section 32.5.
374	Hazards relating to interaction with the Newlands Rail System and the proposed Alpha Coal Project rail line will be mitigated through the following risk treatment measures – blast design plan and monitoring program, management of blasting and handling of explosives in accordance with Australian Standards and Regulations, explosives management plan including maintenance of a blasting exclusion zone and appropriate signage, licensed, trained, experienced and competent personnel, traffic control measures, traffic management plan, bridge or conveyor for hauling waste rock over rail lines.	Chapter 32, section 32.5.
375	Hazards relating to access road / heavy vehicle road intersecting Collinsville-Elphinstone Road will be mitigated through the following risk treatment measures – traffic control measures for crossings and the traffic management plan.	Chapter 32, section 32.5.
376	Hazards relating to interaction with Xstrata mine vehicles travelling along the transport route from mines south of the project to the Xstrata Newlands Mine that bisects Byerwen tenements will be mitigated through the following risk treatment measures – traffic control measures, traffic management plan, and liaison with Xstrata.	Chapter 32, section 32.5.
377	Hazards relating to interaction with the SunWater Pipeline (Burdekin to Moranbah) will be mitigated through the following risk treatment measures – demarcation of easement and traffic controls.	Chapter 32, section 32.5.
378	Hazards relating to interaction with the gas pipeline will be mitigated through the following risk treatment measures – site procedures, site map, signage, contractor management, blast design plan and monitoring program, management of blasting and handling of explosives in accordance with Australian Standards and Regulations, explosives management plan including maintenance of a blasting exclusion zone and appropriate signage, licensed, trainer, experienced and competent personnel.	Chapter 32, section 32.5.
379	Hazards relating to interaction with cattle / livestock, wildlife will be mitigated through the following risk treatment measures – fencing and equipment barricaded.	Chapter 32, section 32.5.
380	A more specific evaluation of hazards will be undertaken when final detailed design and mine operating plans have been developed prior to the construction phase and then prior to the operational phase.	Chapter 32, section 32.7.

#	Proponent commitment	EIS reference
381	Standard health and safety practices will be implemented to address the health and safety risks relevant to the workforce in line with legislation and codes of practice, including the *Coal Mine Health and Safety Act 1999* (CMHS Act) that regulates air contaminants that may occur on a coal mine.	Chapter 33, section 33.4.2.2.
382	The proponent has committed to compliance with Aurizon's Coal Dust Management Plan (CDMP) and the requirements of the Transfer Facilities Licence regarding dust mitigation measures including veneering and load profiling.	Chapter 22, section 22.5.3; Chapter 33, section 33.4.2.2.
383	Any odour-related hazards are well addressed in CMHS legislation and relevant standards and will be complied with at all times during the construction, operation and decommissioning of the project.	Chapter 33, section 33.4.2.3.
384	Information will be made available to all workers outlining risks associated with driver fatigue which can be implemented by workers' families travelling to and from regional centres.	Chapter 33, section 33.4.5.
385	No clearing will be required and will therefore be undertaken outside of the project mining leases.	Chapter 35, section 35.7.2.
386	Appropriate measures will be taken to prevent parthenium becoming established in retained areas of natural grassland to the east of the disturbance. Management measures will include: • development of a weed management plan which specifically addresses measures to prevent spread of parthenium into intact areas of natural grasslands TEC • implementation of appropriate weed management protocols, including the provision of vehicle wash down facilities as described sections above • monitoring in grasslands adjacent to the disturbance area and undertaking appropriate weed eradication programs as required.	Chapter 35, section 35.10.1.2.
387	Management measures to minimise adverse impacts on patches of SEVT TEC will include: • ongoing management of weeds, particularly those which pose a threat in terms of increased fire risk • undertaking dust suppression on haul roads adjacent to new edges.	Chapter 35, section 35.10.1.3.
388	Mitigation and management actions for the Black-throated finch will: • prioritise impact avoidance over impact reduction measures • avoid negative impacts on other MNES • be consistent with relevant recovery, conservation or action plans.	Chapter 35, section 35.10.2.3.1.
389	Water storages will be constructed within the project area and these will offset the removal of permanent, yet artificial, water sources associated with two existing dams.	Chapter 35, section 35.10.2.3.2.

#	Proponent commitment	EIS reference
390	Regular monitoring and reporting on the progress of the offset will be provided to the regulator with biennial photo point monitoring to be conducted and, every seven years, BioCondition assessment(s) to be conducted at the same location(s) as the photo points. These monitoring actions will provide a record of comparability over the term of the offset and the overall progress of the offset in returning to remnant vegetation status. Weed monitoring will be conducted annually by the land manager and recorded. These records will be incorporated into reports to the regulator as per the above schedule of monitoring and reporting.	Chapter 21, section 21.7.3; Chapter 35, section 35.11.6.3.

Table A5 Commitments made in the additional information to the environmental impact statement

#	Proponent commitment	AIEIS and EM Plan reference
391	The proponent will provide suitable communication tower(s) on site to service the project. This infrastructure will also be able to be used to facilitate communications for emergency services for the project.	AIEIS Section 5.4 – Issue Number 5.4; AIEIS Section 15.90 – Issue Number 15.90
392	An updated turn lane warrant assessment, for the northern access intersection with the Collinsville-Elphinstone Road, will be conducted prior to 2030, when the northern access is scheduled for construction, to determine the turning lane requirements associated with this mine access intersection.	AIEIS Section 6.9 – Issue Number 6.9
393	A landing site for the rescue helicopter service will be provided adjacent to both the northern and southern Mine Infrastructure Areas, in accordance with the Civil Aviation Regulations.	AIEIS Section 9.20 – Issue Number 9.20
394	The proponent will consult relevant stakeholders, as required, about potential Scope 1 and Scope 2 greenhouse gas emissions from the project.	AIEIS Section 10.23 – Issue Number 10.23
395	The proponent will consult the relevant road authorities, as required, about: • roads that may be used in and around Glenden to service the accommodation facilities, during the development approval process • any proposed road closure	AIEIS Section 10.25 – Issue Number 10.25
396	The proponent, in consultation with adjoining landowners of Wollombi and Suttor North properties and the Isaac Regional Council, will make an application for permanent road closure of Wollombi Road under section 99(1) of the *Land Act 1994*.	AIEIS Section 10.42 – Issue Number 10.42; AIEIS Section 15.68 – Issue Number 15.68
397	The blast design plan and explosives management plan, which may include plans for temporary road closures during blasting events, will be developed in consultation with the Department of Transport and Main Roads, Regional Councils.	AIEIS Section 10.50 – Issue Number 10.50
398	As a conservative measure the proponent will undertake an additional round of confirmatory stygofauna sampling in project monitoring bores. Sampling will be undertaken prior to the commencement of groundwater dewatering activities and after a preceding wet season.	AIEIS Section 10.69 – Issue Number 10.69; AIEIS Section 15.51 – Issue Number 15.51
399	Isaac Regional Council and the Department of Natural Resources and Mines will be contacted about all potential impacts to stock routes; and arrangements agreed to mitigate impacts to stock routes, including the location of any reroutes, including the tenure / ownership requirements over sections of the stock route that are rerouted.	AIEIS Section 10.77 – Issue Number 10.77
400	The proponent commits to ongoing consultation with Aurizon Network for access to the existing Newlands system rail corridor and will follow the below rail access process as outlined in the Access Undertaking.	AIEIS Section 11.15 – Issue Number 11.15

#	Proponent commitment	AIEIS and EM Plan reference
401	The Erosion and Sediment Control Plan implemented as part of the environmental conditions within the environmental authority (EA), will specify the management of all erosion and sediment control features, including sediment dams capturing sediment laden runoff from waste rock dumps during 'rehabilitation in progress'.	AIEIS Section 12.6 – Issue Number 12.6
402	The proponent is committed to ongoing consultation with adjacent landholders including Glencore (Newlands Coal Project) with respect to water management.	AIEIS Section 12.2 – Issue Number 12.2; AIEIS Section 12.12 – Issue Number 12.12
403	The proponent has committed to the installation of a groundwater monitoring bore at the location of the borehole on the eastern boundary of the wetland (as shown on the map below which also presents groundwater drawdown extents discussed below), targeting the tertiary material and will be established a minimum of twelve months prior to dewatering activities in the area, to ensure a full year of baseline data incorporating any seasonal fluctuations is available.	AIEIS Section 12.4 – Issue Number 12.4; AIEIS Section 12.23 – Issue Number 12.23; AIEIS Section 12.24b – Issue Number 12.24 Cont.; AIEIS Section 18.2 – Issue Number 18.2; AIEIS Section 12.24a – Issue Number 12.24; AIEIS Section 15.34 – Issue Number 15.34; AIEIS Section 15.45 – Issue Number 15.45
404	Water level monitoring will be undertaken in the wetland during periods of inundation to supplement existing data and provide supportive information to update an adaptive management framework. Monitoring of the wetland ecology will be completed bi-annually as part of the Receiving Environment Monitoring Program (REMP). In this way, any potential changes in species abundance in any areas of the wetland can be monitored.	AIEIS Section 12.4 – Issue Number 12.4; AIEIS Section 12.23 – Issue Number 12.23; AIEIS Section 12.24b – Issue Number 12.24 Cont.; AIEIS Section 18.2 – Issue Number 18.2
405	Ongoing monitoring during and post mining activities in the specific catchment area, will assess retention of wetland ecosystem functionality. Mitigation measures will be implemented if required. Specific event driven ecological monitoring will be undertaken where results of REMP monitoring indicates additional data is required.	AIEIS Section 12.4 – Issue Number 12.4; AIEIS Section 12.23 – Issue Number 12.23; AIEIS Section 12.24b – Issue Number 12.24 Cont.; AIEIS Section 18.2 – Issue Number 18.2

#	Proponent commitment	AIEIS and EM Plan reference
406	The proposed surface water and aquatic ecology monitoring locations of the Suttor River are: • 2 monitoring locations upstream of the proposed release point to provide comparative data • BYSW9 • BYSW18 (corresponding to flow gauging location MP1) • 5 downstream (receiving environment) locations, which also form part of the Receiving Environment Monitoring Plan (REMP) • Compliance point, CP1 • FSS16, downstream of the confluence with Suttor Creek • 3 locations proposed around the confluence between Suttor River and Suttor Creek; BYSW20, BYSW21, BYSW22. The Suttor River monitoring locations described above correspond to the monitoring locations described in Appendix 6 of the AIEIS. In addition Kangaroo Creek will be monitored at: • 2 monitoring locations upstream of the proposed release point to provide comparative data • BYSW2 • BYSW3 • Flow gauging station MP2 • 2 downstream (receiving environment) locations, which also form part of the REMP • Compliance point CP2 • FSS05. The REMP will include monitoring locations described above and in Appendix 6 of the AIEIS.	AIEIS Section 12.8 – Issue Number 12.8; AIEIS Section 18.2 – Issue Number 18.2; AIEIS Section 18.3 – Issue Number 18.3; AIEIS Section 21.4 – Issue Number 21.4
407	An RE map amendment report containing photos, maps and justifications for each proposed RE change has been prepared. The RE amendment information was prepared in accordance with the Queensland Herbarium Regional Ecosystem Assessment Kit and submitted directly to DEHP.	AIEIS Section 12.32 – Issue Number 12.32

#	Proponent commitment	AIEIS and EM Plan reference
408	The consequence category of in-pit disposal facilities and co-disposal dams (and other structures) will be assessed by a suitably qualified and experienced person (as defined in the Manual) in accordance with the Manual prior to the design and construction of the structure. A consequence assessment report and certification will be prepared for each structure assessed. Certification will be provided by the suitably qualified and experienced person who undertook the assessment. The detailed design of any regulated structures (including in-pit disposal facilities and co-disposal dams) will be undertaken by a suitably qualified and experienced person with relevant professional experience, and include appropriate documentation and certification (as defined in the Manual). A certified Design Plan, as described in the EHP Guideline – Structures which are dams or levees constructed as part of environmentally relevant activities (EHP, 2013), will be submitted to EHP prior to construction. Additional geotechnical investigations will be undertaken to inform the Design Plan. The floor and sides of the co-disposal dams will be designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam. All regulated dams will have a clearly observable mandatory reporting level (MRL) (determined in accordance with the Manual). The proponent will notify the administering authority on becoming aware of the dam contents reaching the MRL and take appropriate action to prevent or minimise the potential for environmental harm. An annual inspection and assessment of any regulated structure will be undertaken by a suitably qualified and experienced person, and a report prepared with recommendations for ensuring the integrity of the regulated structure is maintained. The proponent will ensure there is sufficient capacity within the dam on 1 November of every year, to meet the design storage allowance (DSA) determined in accordance with the Manual. This is to minimise the risk of contaminants being released from the dam during a high rainfall wet season. The proponent will maintain a register of regulated dams and structures. When developing the Design Plan the proponent will engage with DEHP to determine the scope of details required.	AIEIS Section 12.50 – Issue Number 12.50

#	Proponent commitment	AIEIS and EM Plan reference
409	To ensure that ongoing erosion from waste dumps is managed, and does not impact on third parties, the proponent has committed to a rehabilitation management plan. During the construction and detailed design phase the proponent is committed to consulting with SunWater and the ongoing assessment of hazards. The EIS identified that crossings will be required to the western side of the Burdekin to Moranbah pipeline (BMP) to access waste dumps. During the detailed design phase the proponent will make an application to SunWater for a crossing agreement for the crossing points. The crossing agreement, as negotiated between SunWater and the proponent, will contain conditions for construction and operation of the crossings. The crossing agreement is not required prior to mining lease approval.	AIEIS Section 13.1 – Issue Number 13.1
410	The proponent will consult with the operators of waste facilities in the Mackay and Glenden region, including the Glenden Waste Facility and will make arrangements for acceptance of project wastes which cannot be accepted at the Glenden Waste Facility. Discussions with waste service providers and operators of waste facilities will occur prior to commencement of construction activities.	AIEIS Section 14.5 – Issue Number 14.5
411	If water captured in clean water dams is not considered by the State government to be necessary to satisfy the expected requirements of any future environmental authority then the proponent will make application under the *Water Act 2000* and subordinate legislation (*Water Regulation 2002* and WRBBP) for the taking of overland flow. The proponent will consult the Water Services, Central Region office of DNRM to discuss the requirements for taking overland flow water.	AIEIS Section 15.5 – Issue Number 15.5; AIEIS Section 15.6 – Issue Number 15.6
412	The conceptual design of the diversion channels will be reviewed during detailed design stage. The detailed design will rely on geotechnical advice to confirm the design parameters and stability of the banks to control erosion and scour. They will be designed as stable systems and maintained over the life of the mine, with refinements made if needed, resulting in diversions that are self sustaining, stable and which require no maintenance post closure.	AIEIS Section 15.11 – Issue Number 15.11
413	The channel design presented in Appendix 17 of the EIS will be reviewed and refined at the detail design stage, including modifying the cross section to include low flow and flood flow channels. A detailed assessment considering the ecological requirement for pools and riffles will be undertaken during detailed design. If warranted, pool and riffle zones (sequences) would be incorporated into the design. Key geomorphic indicators such as average slope, width/depth ratio, entrenchment ratio, sinuosity and meander radius of the existing tributary will be replicated in the diversion where possible.	AIEIS Section 15.12 – Issue Number 15.12

#	Proponent commitment	AIEIS and EM Plan reference
414	The exact tie in location of the proposed diversions with the existing tributaries will be determined at detailed design stage. Further information will be collected at detailed design including geotechnical information to assist with these decisions. The design objective is to produce a diversion that is self-sustaining, stable, which does not affect existing infrastructure and which requires no maintenance post closure. The flood modelling undertaken does consider the Northern Missing Link (NML) linear infrastructure as described in Section 5.1 of Appendix 17 of the EIS. Any subsequent detailed design will also consider the NML infrastructure.	AIEIS Section 15.17 – Issue Number 15.17
415	Geotechnical studies will be undertaken during detailed design to inform design of stable batter angles. In situations where long batters are necessary, bioengineering methods to minimise rainfall induced erosion will be used. These may include dense vegetation plantings, benching, armoured drainage chutes or modified channel cross sections to minimise the batter length.	AIEIS Section 15.18 – Issue Number 15.18
416	The proponent will contact DNRM to discuss authorisation requirements should proposed activities associated with the crossings within a watercourse, lake or spring as defined in the *Water Act 2000* not be carried out in accordance with the exemption requirements.	AIEIS Section 15.20 – Issue Number 15.20
417	With specific regard to watercourse diversions, the proponent commits that any diversion of a watercourse as defined under the *Water Act 2000,* will be designed, constructed, monitored and maintained in accordance with the regional departmental guideline, entitled Central West Water Management and Use Regional Guideline: Watercourse Diversions – *Central Queensland Mining Industry version 5 (2011)* and the principles within the relevant Australian Coal Association Research Program (ACARP) Projects. The proponent is committed to obtaining all necessary project approvals outlined in Chapter 3 of the EIS. Specifically the proponent commits to undertaking proposals in accordance with relevant guidelines, or in accordance with provisions of relevant legislation and sub-ordinate legislation, including the commitment to seek appropriate approvals under the relevant legislation, where required.	AIEIS Section 15.21 – Issue Number 15.21
418	The proponent will record the volume of water extracted during pit dewatering, as part of overall site water and dam management.	AIEIS Section 15.44 – Issue Number 15.44
419	The proponent has committed to ongoing groundwater quality and groundwater level monitoring as part of the draft environmental authority (EA) conditions outlined in the project's revised Environmental Management Plan. EA condition E5 commits the proponent to undertaking an investigation into any exceedance of set groundwater quality or groundwater level limits.	AIEIS Section 15.46 – Issue Number 15.46; AIEIS Section 15.7 – Issue Number 15.47

#	Proponent commitment	AIEIS and EM Plan reference
420	The proponent will adopt the groundwater monitoring strategy as described in the proposed EA conditions contained within the revised EM Plan which commits to monitoring of private groundwater bores.	AIEIS Section 15.48 – Issue Number 15.48
421	As required by the *Petroleum and Gas (Production and Safety) Act 2004,* the proponent will consult with overlapping tenure holders and ensure that all legal requirements are met.	AIEIS Section 15.52 – Issue Number 15.52
422	The proponent recognises that tenement holdings and tenement boundaries change over time; and will continually monitor overlapping tenement holdings and boundaries in order to comply with legislative requirements about interaction with overlapping tenement holders.	AIEIS Section 15.54 – Issue Number 15.54
423	If the SCL validation assessments demonstrate that the land is SCL, then the proponent will follow the assessment process for SCL in a Management Area, as prescribed by the *Strategic Cropping Land Act 2011* (SCL Act). Depending on the nature of activities proposed on SCL, this will be either a compliance certificate application or protection decision application.	AIEIS Section 15.58 – Issue Number 15.58
424	Approvals will be sought and the relevant DNRM Senior Lands Officer (Stock Routes) and local government stock route officer will be consulted from the early planning stages for all works associated with temporary road and stock route closures and relocations. All road and stock route closures or relocations will be communicated to the public.	AIEIS Section 15.67 – Issue Number 15.67
425	The proponent will comply with the principles of the Queensland Resources and Energy Sector Code of Practice for Local Content (2013), namely 'provide full, fair and reasonable opportunity for capable local industry to compete for the supply of goods and service'. This will be implemented through: • Ensuring the principles of the code are integrated within procurement strategies. • Ensuring early and ongoing engagement of local industry. • Identifying capable local industry and promote procurement opportunities with local industry.	AIEIS Section 15.69 – Issue Number 15.69
426	Chipped / mulched material will be stored in stockpiles for the minimum duration necessary. If stored for longer than one month, stockpiles will be stabilised and covered. The temperature of stockpiles will be regularly monitored and stockpiles will be turned as required. Stockpiles will be located in areas where they will not be affected by flood flows from creeks, and overland flows will be diverted around stockpiles.	AIEIS Section 15.83 – Issue Number 15.83
427	The light vehicle policy for the project operations will reflect the intent that light vehicle use by the workforce to/from site will be discouraged.	AIEIS Section 15.84 – Issue Number 15.84
428	The project workforce will be required to comply with the driver fatigue management plans for the project. Procedures will be implemented to allow for monitoring of compliance with the driver fatigue management plans.	AIEIS Section 15.86 – Issue Number 15.86

#	Proponent commitment	AIEIS and EM Plan reference
429	Sewage treatment and treated sewage effluent use will be undertaken in accordance with the proposed EA conditions for sewage effluent outlined in Section 16.9 of the EM Plan.	AIEIS Section 16.1 – Issue Number 16.1
430	In accordance with mitigation approaches presented in the Queensland Health document '*Guidelines to minimise mosquito and biting midge problems in new development areas*' the potential for the creation of mosquito/biting midge breeding sites during the construction phase will be minimised by: • ensuring that no stagnant ponding occurs • ensuring that all stream crossing allow for unrestricted passage of fish to maintain populations of natural predators • filling potential breeding sites such as depressions, pot holes, borrow pits and wheelruts on the project site • preventing spoil materials, road embankments, access roads and soil from blocking the flow of water and creating stagnant pools of water suitable for mosquito breeding.	AIEIS Section 16.3 – Issue Number 16.3
431	The proponent will have an Employee Assistance Program, which will assist in identifying worker's exposure to alcohol, drugs, mental health, sexual health related issues, physical injury, fatigue, respiratory illness and chronic diseases and provide a mechanism to provide confidential ongoing assistance to the workers.	AIEIS Section 16.4 – Issue Number 16.4
432	If not suitable for direct release to the environment, sediment affected and mine affected water will be contained in dams until flows within receiving waters provide sufficient dilution (through controlled blending of waters) to allow for release to the environment. Mine affected water would not be discharged from site except through the controlled release strategy that will be incorporated into the project's EA.	AIEIS Section 21.2 – Issue Number 21.2
433	The proponent will negotiate with landholders the ongoing use of land within the project area, that is not subject to disturbance, for existing land practices, such as grazing. During this negotiation process the proponent will consult with landholders about grazing practices and emphasise the importance of managing grazing within riparian grassland areas.	AIEIS Section 21.6 – Issue Number 21.6
434	When requested, the proponent will assist QFRS with bushfire mitigation measures, where possible.	EIS Appendix 33, section 1.3
435	The proponent will regularly undertake reviews of the effectiveness of the Emergency Management Plan.	EIS Appendix 33, section 6
436	The proponent will continue to liaise with parties regarding the stock route.	Additional Information on EIS and AIEIS – OCG
437	The proponent will liaise with DATSIMA Regional Directors regarding opportunities for Traditional Owner Groups.	Additional Information on EIS and AIEIS – DATSIMA
438	The proponent will liaise with DETE regarding training and workforce participation initiatives for the project.	Additional Information on EIS and AIEIS – DETE

#	Proponent commitment	AIEIS and EM Plan reference
439	A map/s showing the location of existing/proposed regulated structures on-site and any related release points, will be included in the Plan of Operations, for the relevant period.	Additional Information on EIS and AIEIS – DEHP
440	An ambient dust monitoring program will be developed and implemented.	EM Plan Section 13.5.3 - Additional Information on EIS and AIEIS – DEHP
441	An irrigation management plan for the proposed sewage treatment plant will be prepared prior to its construction.	EM Plan Section 16.8.1 - Additional Information on EIS and AIEIS – DEHP
442	A topsoil management plan will be developed and implemented. The topsoil management plan will include (but is not limited to): • a topsoil inventory • tracking process for volumes and location of stripped topsoil • tracking process for volumes and location of stockpiled topsoil • where required a reconciliation of stripped/stored topsoil against rehabilitation requirements • topsoil stockpiling and seeding instructions • requirements against the topsoil management man condition in Schedule H of the EA (Section 8.7 of this document). A topsoil inventory and stockpile locations will be detailed in the Plan of Operations.	EM Plan Section 10.5.2 - Additional Information on EIS and AIEIS – DEHP
443	A rehabilitation monitoring program will be prepared that should be implemented by a person possessing appropriate qualifications and experience in the field of rehabilitation management, nominated by the environmental authority holder. The rehabilitation monitoring program will include but is not limited to: • monitoring of rehabilitation for the rehabilitation completion criteria stated in the EA • monitoring of reference sites to track any natural variation in condition • the establishment of reference sites applicable to the various disturbance areas, should be within 12 months prior to the commencement of rehabilitation activities to ensure appropriate reference data is available for comparison • process to allow comparison of rehabilitated areas against reference sites and EA completion criteria.	EM Plan Section 9.6.1 - Additional Information on EIS and AIEIS – DEHP

#	Proponent commitment	AIEIS and EM Plan reference
444	A post closure management plan for the project site will be prepared that should be developed at least 18 months prior to the final coal processing on site and implemented for a nominal period of: • at least 30 years following final coal processing on site; or • a shorter period if the site is proven to be geotechnically and geochemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm; or • a shorter period if the underlying landholder agrees to take over the site and all associated ongoing management; or • a shorter period if a subsequent EA supersedes the existing EA for any operation on the site; and • meet current guidelines and standards to post closure management at the time of closure for the Byerwen Coal Project.	EMP Section 9.8.4 - Additional Information on EIS and AIEIS – DEHP
445	A final void investigation will be prepared in order to develop mine decommissioning acceptance criteria. A residual void water quality management study will be prepared and will be reviewed every 5 years.	EM Plan Section 9.5.2.1 - Additional Information on EIS and AIEIS – DEHP
446	A Receiving Environment Monitoring Program (REMP) will be developed 12 months prior to any planned mine affected water release and/or interference with the wetland catchment, to assess the local receiving waters for the specified discharge locations, and be based on the monitoring locations described in the EM Plan.	EM Plan Section 6.6.1 Additional Information on EIS and AIEIS – DEHP
447	A water management plan will be developed and implemented prior to the requirement to construct any water management infrastructure.	EM Plan Section 6.5.5 Additional Information on EIS and AIEIS – DEHP

Appendix 7. Threat abatement plans, species recovery plans and conservation advice

Schedule 1. Threat abatement plans

Part A. Feral cat threat abatement plan

The goal of the feral cat threat abatement plan (TAP) is to minimise the impact of cats on biodiversity in Australia and its territories. The Squatter pigeon is listed as a species of concern under this TAP. The five main objectives and associated recovery actions in order to achieve this goal are as follows:

(a) Prevent feral cats occupying new areas in Australia and eradicate feral cats from high-conservation-value 'islands' by:

  (i) collating data on offshore islands and developing and implementing management plans to prevent, monitor, contain and eradicate any cat incursions

  (ii) working with communities to prevent incursion

  (iii) monitoring native prey species in areas eradicated of cats.

(b) Promote the maintenance and recovery of native species and ecological communities that are affected by feral cat predation by:

  (i) identifying priority areas for cat control and conducting and monitoring regional cat control in these areas; and

  (ii) applying incentives to promote and maintain on private or lease hold land within or adjacent to priority areas.

(c) Improve knowledge and understanding of feral cat impacts and interactions with other species and other ecological processes by:

  (i) developing simple and cost effective methods for monitoring populations and impacts of foxes

  (ii) investigating interactions between foxes and native carnivores

  (iii) determining the nature of interactions between foxes and other pest animals

  (iv) determining impacts of cat-borne diseases

  (v) identifying unintended effects of fox control conducted in isolation.

(d) Improve effectiveness, target specificity, humaneness and integration of control options for feral cats by:

  (i) developing an effective toxin-bait for cats

  (ii) determining appropriate baiting strategies

  (iii) ensuring habitat rehabilitation and management of potential prey

  (iv) testing and disseminating information on exclusion fence designs regarding cost-effectiveness

(v) continuing to promote the adoption and adaptation of model codes of practice and standard operating procedures for the humane management of feral cats.

(e) Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage feral cats by:

(i) promoting understanding of the threat to biodiversity posed by feral cats and support for their control, including the use of humane and best-practice cost-effective controls

(ii) developing communication campaigns to accompany the release of new broad scale cat control techniques.

Part B. Feral pig threat abatement plan

The pig TAP sets out a national framework to guide the coordinated implementation of the objectives and actions considered necessary to manage the environmental damage caused by feral pigs to species and ecological communities affected by the process. The five main objectives and associated recovery actions in order to achieve this goal are as follows:

(a) To prevent feral pigs from establishing in areas where they currently do not occur or are in low eradicable numbers, and where they are likely to pose a threat to biodiversity, especially where they would impact on nationally listed threatened species and ecological communities by:

(i) identifying areas currently free from feral pigs or where they are eradicable

(ii) verifying presence or absence of feral pigs in priority areas and developing and implementing management strategies to remove feral pigs from priority areas

(iii) providing awareness programs to recreational hunters, bushwalkers and land managers

(iv) reviewing the adequacy and effectiveness of existing legislation.

(b) To integrate feral pig management plans and their implementation into natural resource planning and investment at the regional, state and territory, and national level through consultation and liaison with key stakeholders by:

(i) coordination between the department and relevant state and territory agencies to set out key concerns and issues to be included in Natural Resource management plans and to establish protocols and use funding and other relevant mechanisms to improve the consistency and coordination of actions across tenures and jurisdictions.

(c) To increase awareness and understanding of land managers and the general community about the damage that feral pigs cause and management options by:

(i) assessing the adequacy of available information and dissemination of appropriate material to target groups

(ii) supporting the completion, dissemination and adoption of the pest management component of the Conservation and Land Management Training Package being developed by the National Training Authority.

(d) To quantify the impacts feral pigs have on biodiversity (especially nationally listed threatened species and ecological communities) and determine the relationship between feral pig density and the level of damage by:

(i) identifying priority areas under threat by feral pigs

(ii) developing and implementing appropriate studies that aim to determine the impact of feral pigs on listed species and the level of control required to reduce the impact to a significant level.

(e) To improve the effectiveness, efficiency and humaneness of techniques and strategies for managing the environmental damage due to feral pigs by:

(i) assessing the need for the development of more effective and humane techniques and strategies when managing feral pigs

(ii) assessing these techniques and strategies through an analysis of costs and benefits, safety, potential impact on non-target species, legal issues and any other practical considerations, and formulate a regional best practice approach.

Part C. Threat Abatement Plan for Predation by the European Red Fox

The goal of the threat abatement plan is to minimise the impact of foxes on biodiversity in Australia and its territories by: protecting affected native species and ecological communities, and preventing further species and ecological communities from becoming threatened. The specific objectives and action items to achieve this are as follows:

(a) The objective of prevent foxes occupying new areas in Australia and eradicate foxes from high-conservation-value 'islands'.

(i) collate data on offshore islands and isolated mainland 'islands', assess their conservation value, the likelihood of significant biodiversity impacts from foxes and, if there are no foxes present, rank the level of risk of foxes being introduced and establishing populations

(ii) develop management plans to prevent, monitor and, if incursions occur, contain and eradicate any fox incursion, for 'islands' with high conservation values

(iii) implement management plans for high-conservation-value 'islands', including prevention and monitoring actions, and containment or eradication actions if incursions occur

(iv) eradicate established populations of foxes from 'islands' with high conservation values (including Tasmania) where this is cost-effective, feasible and a conservation priority.

(b) The objective of promote maintenance and recovery of threatened species and ecological communities that are affected by fox predation.

(i) identify priority areas for fox control based on:

• the significance of the population of the affected native species or of the ecological community

• the degree of threat posed by foxes to species and ecological communities relative to other threats

• the cost-effectiveness of maintaining fox populations below an identified 'damage threshold' in the region, and

• the feasibility of effective remedial action

(ii) conduct and monitor regional fox control, through new or existing programs, in priority areas identified in Action 2.1

(iii) apply incentives (other than bounties), partnerships and negotiated agreements to promote and maintain on-ground fox control on private or leasehold lands within or adjacent to priority sites identified in Action 2.1.

(c) The objective of improve knowledge and understanding of fox impacts and interactions with other species and ecological processes.

(i) develop simple and cost-effective methods for monitoring populations of foxes and the impacts of foxes, including reliable methods for monitoring foxes and key native species at different densities, including very low densities

(ii) investigate interactions between foxes and native carnivores to identify the significance of competition and predation by foxes to these native species

(iii) determine the nature of interactions between foxes, feral cats, wild dogs and rabbits to effectively integrate fox control activities for all four species

(iv) Identify any unintended effects that fox control may have if conducted in isolation from other management activities

(v) develop means for estimating the environmental and other associated costs of impacts arising from foxes.

(d) The objective of improve the effectiveness, target specificity, integration and humaneness of control options for foxes.

(i) conduct research and extension to improve the effectiveness, target specificity and humaneness of existing toxin-bait media and baiting methods

(ii) conduct further work on the development of new, or improvements to existing, control techniques

(iii) test and disseminate information on exclusion fence designs and other control methods regarding their cost-effectiveness for particular habitats or topography

(iv) investigate the feasibility of control techniques to target foxes, but not dingoes, in some areas

(v) develop training programs to help land managers identify locally appropriate control method(s) and when (i.e. circumstances and times) to apply them in controlling foxes

(vi) ensure that habitat rehabilitation and management of potential prey, competitors and predators of foxes are considered in fox control programs

(vii) continue to promote the adoption and adaptation of the model codes of practice and standard operating procedures for humane management of foxes.

(e) The objective of increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage foxes.

(i) promote:

• broad understanding of the threat to biodiversity posed by foxes and support for their control

• support for the actions to be undertaken under this plan

• the use of humane and cost-effective fox control methods

• best-practice effective fox control in all tenures, and

• understanding of predation by foxes as a key threatening process.

Schedule 2. Species recovery plans

Part A. Proposed brigalow (*Acacia-harpophylla dominant and co-dominant*) recovery plan[46]

The main objective of this proposed plan is to conserve and enhance the environmental values of the brigalow ecological community over the long term, by working to increase the extent of both remnant and regrowth brigalow and improving its condition and management.

The specific objectives and action items proposed in the proposed national recovery plan for the listed brigalow ecological community include the following:

(a) Increase the area of the brigalow ecological community and its representation in conservation reserves by:

(i) avoiding further clearing and fragmentation of the brigalow ecological community

(ii) increasing the extent and representativeness the ecological community within the reserve estate

(iii) encouraging the use of conservation agreements over remnant and regrowth brigalow outside reserves.

(b) Improve knowledge of the brigalow ecological community and its condition as habitat for native species by:

(i) researching the ecology of brigalow ecosystems

(ii) surveying key areas of Brigalow vegetation to assess their condition and identify relevant threats

(iii) experimenting with methods to assist advanced regrowth to attain the structural and floristic characteristics of mature remnant brigalow.

[46] Butler, DW, *Recovery plan for the "Brigalow (Acacia harpophylla dominant and co-dominant" endangered ecological community (draft of 1 May 2007)*: *Report to the Department of the Environment and Water Resources*, Queensland National Parks and Wildlife Service, Brisbane, 2007, viewed 28 May 2014, www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=28#listing_advice_loop

(c) Mitigate key threats to the brigalow ecological community by on-ground management and controlling fire, weeds and animal pests by:

(i) facilitating the restoration of degraded remnants

(ii) establishing regional benchmarks for habitat condition for each of the component vegetation types and regional ecosystems

(iii) establishing and implementing pest plans for key areas of the ecological community

(iv) establishing and implementing fire reduction plans for key areas of the ecological community.

(d) Increase community awareness and involvement by:

(i) promoting awareness of the ecological community's conservation and management

(ii) encouraging landholders (especially coal mining companies) to become involved in the ecological community's conservation and management

(iii) consulting with traditional owner groups to identify indigenous knowledge of and association with the ecological community.

(e) Potential to earn carbon credits through restoring cleared brigalow lands may provide a significant impetus for restoration attempts.

Part B. National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar bioregions" ecological community

The overall objective of this plan is to maintain and conserve the environmental values of the Semi-evergreen vine thicket ecological community (SEVT EC) over the long term, by minimising the loss of both remnant and regrowth SEVT and improving their condition and management. The specific objectives and action items to achieve this are as follows:

(a) Identify and evaluate the extent, biodiversity value and condition of remnant and regrowth areas of SEVT EC in the Brigalow Belt (north and south) and Nandewar bioregions by:

(i) completing mapping of remnant SEVT EC in New South Wales and refine mapping of the Queensland remnants

(ii) evaluating methodologies for condition assessment in the SEVT EC and establish benchmark sites for each component regional ecosystem

(iii) determining the extent and condition of areas of the SEVT EC affected by invasive plant species, particularly weeds of national significance

(iv) surveying poorly known species, especially fungi, herpetofauna and invertebrates

(v) identifying key ecosystem components and processes and determine their response to common management practices

(vi) monitoring selected populations of the EPBC listed species across their distribution within the SEVT EC.

(b) Establish a comprehensive, adequate and representative system of SEVT EC areas across the Brigalow Belt (north and south) and Nandewar bioregions, protected either by reservation or conservation agreements by:

(i) increasing the extent and representativeness of SEVT EC within the conservation estate

(ii) encouraging landholders to enter into conservation agreements over semi-evergreen vine thickets.

(c) Ensure 'best practice' management is applied to sites containing SEVT EC by:

(i) liaising with landholders and other natural resource managers to develop appropriate burning practices and other procedures to minimize fire damage to remnant areas of SEVT on private and public lands

(ii) determining the impact of grazing animals, both domestic and native, on remnant areas of SEVT through ex-closure trials

(iii) developing guidelines and recommendations for fencing

(iv) developing and implementing a pest management program to control feral animals in SEVT remnants

(v) developing strategies to minimise adverse impacts of native macropods, particularly the Black-striped wallaby *Macropus dorsalis* where it is overabundant, on remnant SEVT and other vegetation used as shelter

(vi) encouraging landholders through appropriate incentive programs to protect and foster regrowth SEVT and associated vegetation in buffer areas around and in corridors linking remnant SEVT

(vii) undertaking studies of the impact on the SEVT EC of invasive shade-tolerant grasses and other ground stratum species such as *Rivina humilis* and *Ageratum* spp.

(viii) researching and developing use of SEVT species for landscape rehabilitation in areas where SEVT would naturally have occurred prior to clearing, and encourage mines, main roads and others to use native species in plantings.

(d) Encourage involvement of landholders and the community in the conservation and management of the SEVT EC by:

(i) establishing a SEVT conservation management network

(ii) undertaking consultation with traditional owner groups to determine the level of indigenous knowledge of and association with the SEVT EC

(iii) consulting with and involving traditional owners when conducting works in SEVT EC.

(e) Enhance the ability of government and nongovernment organisations at the national, regional and local levels (including consent authorities) to recognise and incorporate SEVT EC conservation issues into all planning processes by:

(i) developing and implementing an education program to increase the awareness of government and nongovernment organisations regarding SEVT conservation, and their responsibilities for SEVT protection and management.

Part C. Queensland Brigalow Belt reptile recovery plan 2008-2012[47]

This plan aims to secure and improve the long term survival of the species and their key habitat, and to raise awareness of reptile conservation issues within the community. The specific objectives and action items to achieve this are as follows:

(a) Identify and protect key habitat and important populations on private and state controlled lands through the development of partnerships between relevant stakeholders by:

  (i) inspecting and identifying key habitat and important populations for each species and prioritise for management and for local government and community engagement

  (ii) identifying key threats and develop reptile habitat management guidelines for key habitat

  (iii) negotiating management agreements and voluntary conservation agreements for the protection of priority management areas and key habitat areas, and important populations in line with the recommended management guidelines.

(b) Reduce and manage the major threatening processes affecting threatened reptiles in the Queensland Brigalow Belt (QBB) by:

  (i) providing incentive mechanisms and facilitating community on-ground projects for the protection of threatened reptiles and their habitat across a suite of land tenures

  (ii) providing incentive mechanisms through resources and/or technical advice and facilitate the up-take of appropriate management of key habitat and threatening processes for QBB reptile species by industry stakeholders

  (iii) working with local governments to protect reptile habitat on the stock route network and shire roadsides and reserves

  (iv) incorporating environmental protection authority ecological fire management guidelines into property and reserve planning for key habitat areas

  (v) encouraging higher participation in integrated pest management activities.

(c) Ensure reptile conservation is incorporated into appropriate land management decisions within all levels of government, industry and community by:

  (i) working with key stakeholders to incorporate relevant information from the recovery plan into relevant management policies, strategies and plans

  (ii) working with natural resource management regional bodies to deliver region specific information necessary for the implementation of on-ground reptile recovery actions

  (iii) maintaining the recovery team to represent broad stakeholder support.

---

[47] Richardson, R, *Queensland Brigalow Belt reptile recovery plan 2008-2012,* Report to the Department of Environment, Water, Heritage and the Arts, WWF Australia, Brisbane, 2006.

(d) Increase community participation, awareness and understanding in the conservation and management issues of threatened reptiles by:
    (i) preparing education material and undertake community extension
    (ii) incorporating reptile conservation in Indigenous cultural education activities
    (iii) maintaining a working relationship with the Indigenous community to progress Indigenous involvement in the recovery program.

(e) Increase knowledge and understanding of the species and their ecology necessary to affect their conservation and management by.
    (i) working with landholders and key stakeholders to undertake monitoring programs on selected sites
    (ii) identifying gaps in species research, develop research priorities, provide research projects to tertiary and research institutions, and help support their implementation
    (iii) incorporating information on the species listed in this recovery plan into the Wildnet database
    (iv) establishing the taxonomic status of the Darling Downs population of the lizard presently known as *Tympancryptis pinguicolla*
    (v) monitoring and evaluating the plan applying an adaptive management approach.

Part D. National recovery plan for the Black-throated finch southern subspecies (*Poephila cincta cincta*)[48]

The southern subspecies of the Black-throated finch (BTF) is currently listed in Appendix II of CITES, as 'endangered' under the EPBC Act, as 'endangered' under the schedules of the NSW *Threatened Species Conservation Act 1995* and 'vulnerable' under the Queensland *Nature Conservation Act 1992*.

The overall objective of the plan is to manage and protect the BTF and its habitat, and to promote the recovery of the southern subspecies. The actions listed in the plan seek to understand the relative importance of the known threats, to verify the suspected decline of the subspecies and protect and enhance existing habitat. Specific objectives of the plan and the actions proposed to achieve them are as follows:

(a) Identify and quantify threats by:
    (i) investigating breeding requirements and threats to key breeding areas
    (ii) investigating feeding and other habitat requirements.

(b) Quantify distribution and abundance by:
    (i) documenting sightings
    (ii) developing standard survey guidelines
    (iii) undertaking mapping and habitat modelling
    (iv) undertaking targeted surveys

[48] Black-throated Finch Recovery Team, *National recovery plan for the Black-throated finch southern subspecies Poephila cincta cincta: Report to the Department of the Environment and Water Resources*, Department of Environment and Climate Change (NSW) and Queensland Parks and Wildlife Service, Canberra, 2007, viewed 13 May 2014, www.environment.gov.au/system/files/resources/f164f090-6c72-4e29-a91b-0037b82f4250/files/p-cincta.pdf

(c) Protect and enhance habitat by:

(i) securing selected sites for conservation

(ii) addressing threats on grazing lands

(iii) monitoring management effectiveness

(iv) investigating development of other statutory planning instruments to minimise impacts of development on BTF.

(d) Investigate potential for captive birds contributing to a re-introduction project by:

(i) determining suitability of birds currently in captivity for a reintroduction project.

(e) Increase public awareness by:

(i) increasing public awareness of the status of and threats to the subspecies.

Guidelines for habitat management provided in the plan include:

(a) management of overgrazing of the riparian grassland that is the main habitat of the species

(b) management of clearing and fragmentation of woodland, riverside habitats and wattle shrubland

(c) management practices aimed at minimising impacts on habitat by domestic stock and rabbits, including alterations to fuel load, vegetation structure and wet season food availability

(d) fire management

(e) weed management strategies to minimise invasion of habitat by exotic weed species, including exotic grasses.

Part E. National recovery plan for the northern quoll *(Dasyurus hallucatus)*

The overall objective of the plan is to minimise the rate of decline of the northern quoll in Australia, and ensure that viable populations remain in each of the major regions of distribution into the future by:

(a) Protecting northern quoll populations on offshore islands from invasion and establishment of cane toads, cats and other potential invasive species by:

(i) maintaining biosecurity of important offshore islands through quarantine invasion and establishment of cane toads, cats and other potential invasive species

(ii) monitoring offshore islands supporting quoll populations to detect the presence of cane toads, cats and any other potential invasive predator

(iii) developing and, where required, implementing a strategy for rapid-response control of cane toad or cat outbreaks on offshore islands occupied by northern quolls.

(b) Fostering the recovery of northern quoll sub-populations in areas where the species has survived alongside cane toads by:

(i) determining which factors affect survival and recovery of northern quolls in areas with cane toads

(ii) using information from Action 2a to assist surviving populations to recover in sympathy with cane toads

(iii) identifying potential refuge habitats in Western Australia and the Northern Territory where quolls might be most likely to persist in the long term alongside cane toads

(c) Halting northern quoll declines in areas not yet colonised by cane toads by:

(i) collecting baseline data on population densities and monitor trends of quolls at a series of key sites not currently occupied by cane toads

(ii) investigating factors causing declines in northern quoll populations not yet affected by cane toads

(iii) managing key quoll populations in areas not currently affected by cane toads to halt population declines

(iv) identify the effect of pastoral land management practices on northern quoll persistence

(v) interim fire management at potential key quoll populations

(vi) refine models of the current and expected distribution of cane toads and northern quolls, incorporating predictions of climate change.

(d) Halting declines in areas recently colonised by cane toads by:

(i) continuing research into the susceptibility of quolls to cane toad poisoning

(ii) testing the efficacy of control measures for cane toads and whether they allow local persistence of quoll populations.

(e) Maintaining secure populations and source animals for future reintroductions/introductions, if they become appropriate by:

(i) managing translocated populations of northern quolls on Astell and Pobassoo Islands

(ii) Northern Territory and West Australia to maintain captive breeding population(s) or northern quolls

(iii) protection of key secure populations through protection of habitat in National Parks and Conservation Agreements

(iv) Northern Territory and West Australia to determine the status of northern quolls on islands with suitable habitat and assess the potential for future translocations to these islands.

(f) Reducing the risk of northern quoll populations being impacted by disease by:

(i) increasing knowledge and monitoring for disease in northern quoll populations.

(g) Reducing the impact of feral predators on northern quolls by:

(i) assessing the impacts of feral predators on populations of northern quolls

(ii) implementing efforts to protect key northern quoll populations from the impacts of feral predators.

(h) Raising public awareness of the plight of northern quolls and the need for biosecurity of islands and West Australia by:

(i) developing new and promoting existing materials for educating the public on the need for quarantine measures at important island habitat for quolls and along major routes westward into Western Australia

(ii) providing materials and support to Indigenous rangers and other groups responsible for habitat critical to the survival of northern quolls to educate their communities on the importance of cane toad and cat control and quarantine measures

(iii) implementing a broader public education awareness campaign on quolls and feral species (particularly cane toads and cats)

(iv) developing and implementing public education and awareness campaigns on land management threats to quolls.

Part F. National recovery plan for the red goshawk *(Erythrotriorchis radiatus)*

The red goshawk is listed under CITES. The main cause of the decline of the red goshawk is widespread clearance of native forests and woodlands. Other threats to the species include fragmentation and degradation of habitat, direct disturbance and/or loss of nesting sites and changes in prey availability. The objective of the recovery plan is to maintain populations of red goshawk across their range and implement measures to promote recovery of the species. The specific objectives and action items to achieve this are as follows:

(a) Identify and map important red goshawk habitat by:

(i) collating information on known nest sites from the past 25 years

(ii) producing descriptive maps of important habitat for the red goshawk

(iii) conducting searches to identify previously unknown pairs of red goshawks, nest sites, and habitats critical for red goshawk survival.

(b) Protect and appropriately manage important habitat areas to ensure long-term survival of the red goshawk by:

(i) providing specific information and advice to government agencies and non-government organisations to assist with the identification, acquisition and management of important red goshawk habitat

(ii) reducing the effects of habitat fragmentation and habitat degradation by encouraging land owners to enter into voluntary conservation covenants/agreements in areas were red goshawks are located to protect both the birds and their habitat

(iii) conducting research to understand the relationship between fragmentation, prey density and population persistence to better inform management

(iv) monitoring red goshawk habitat.

(c) Increase knowledge about the red goshawk's productive success and its survival by:

(i) monitoring at least 20 nest sites each year to determine territory occupancy and productivity, and use DNA analyses of feathers to determine adult survival rates

(ii) training personnel from state and local government to identify and understand the threats to red goshawk habitat.

(d) Identify important populations of red goshawks by:

(i) identifying important populations and nest sites of red goshawks and use the information to inform monitoring programs and state and federal government planning frameworks

(ii) ensuring location information about red goshawk nest sites is secure.

(e) Increase community awareness about the red goshawk and the conservation of the species by:

(i) producing and distribute information / educational materials on the conservation status and habitat requirements of the red goshawk

(ii) providing feedback to the public and agency personnel on progress of red goshawk recovery

(iii) reviewing the effectiveness of the community awareness program.

Schedule 3. Approved conservation advice

Part A. Approved conservation advice for Brigalow (*Acacia harpophylla dominant and co-dominant*) ecological community[49]

Priority recovery and threat abatement actions are as follows:

Threat reduction/control

(a) Protect and conserve remnant and regrowth areas of the ecological community. Prevent clearance of this endangered ecological community and of nearby native vegetation including buffer zones and connecting corridors.

(b) Where further clearance is unavoidable:

(i) mitigate the severity of impacts (e.g. avoid higher quality areas, avoid dissection of patches, act to minimise hydrological disruption and the spread of weeds)

(ii) offsetting should consider the location and emulate qualities of affected patches.

(c) Manage areas of the brigalow ecological community to reduce threats, including through:

(i) fire management that considers Brigalow conservation, protection, and ecological heterogeneity

(ii) targeted weed and feral animal control with a particular focus on high biomass exotic grasses (buffel grass, Rhodes grass, green panic grass) and feral pigs.

[49] Commonwealth of Australia, *Brigalow (Acacia harpophylla dominant and co-dominant) ecological community Approved Conservation Advice,* Department of the Environment, Canberra, 2013, viewed 3 June 2014, www.environment.gov.au/biodiversity/threatened/communities/pubs/028-conservation-advice.pdf

(d) Manage all weeds appropriately within and close to the brigalow ecological community; e.g. spot application of herbicides, rather than aerial spraying; avoid fertiliser application; minimise tree thinning and soil disturbance

(e) Manage foxes and cats (as well as feral pigs) using a coordinated approach, preferably among groups of neighbours and across regions

(f) Help woodland birds to avoid aggression from noisy miners by: encouraging and protecting shrubby understorey; managing grazing pressure so that it does not degrade native vegetation; and retaining dense stands of trees and regrowth.

Land management

(f) Encourage landholders to balance primary production and the conservation of native flora and fauna within and close to the ecological community. Examples of this are:

  (i) managing stocking rates, paddock numbers/sizes, grazing practices and livestock camp sites to avoid damage to woodland understorey and ground cover - this may include adopting rotational or cell grazing regimes; or, excluding grazing entirely from intact stands of brigalow where appropriate (e.g. unless managing fuel loads through grazing)

  (ii) leaving trees, or clumps of regrowth, in paddocks to maintain connections between patches of native flora and fauna habitat

  (iii) connecting shade-lines to one another and keeping them as wide as possible (ideally more than 100 m)

  (iv) avoiding the application of fertiliser, or the aerial / broad scale spraying of herbicides

  (v) leaving dead trees standing and allowing dead timber and leaf litter to rot where it falls on the ground.

(g) Undertake regeneration of high value regrowth sites and revegetation of degraded sites

(h) Increase the area of the brigalow ecological community managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders

(i) Establish adequate buffer zones to protect remnants

(j) Devise and implement water management, sediment erosion and pollution control and monitoring plans.

Management for wildlife

(k) Undertake management actions that help to increase the diversity of species and their abundance; this requires thinking about habitat use at multiple scales. General management actions that benefit many fauna species include:

  (i) retaining fallen timber and leaf litter for small mammals and reptiles

  (ii) retaining standing dead trees or old trees with hollow limbs for nesting sites for birds, mammals and reptiles

  (iii) re-introducing micro-habitat features (e.g. rocks, logs and other woody debris) to sites disturbed during proposed work

(iv) discouraging species like noisy miners and introduced predators by maintaining large patches of woodland with complex structure

(v) avoiding clearing remnant vegetation; and retaining areas of brigalow regrowth.

(l) Encourage woodland regeneration close to areas of existing woodland.

Develop and propagate conservation information

(m) In consultation with land managers, local and state authorities and Indigenous groups

(i) develop and propagate environmentally sustainable management guidelines and technical material to assist land managers, including measure to address inappropriate fire regimes, plant pathogens, invasive animal management, weed management and health and maintenance of the ecological community

(ii) develop or support appropriate existing education programs, information products and signage to help the public recognise the presence and importance of the ecological community, and encourage compliance with their responsibilities under state and local regulations and the EPBC Act.

Part B. Approved conservation advice for Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin[50]

The main identified threats to the Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural grasslands) ecological community are: Grazing, cropping and pasture improvement; weeds and pest animals; mining activities; construction of roads and other infrastructure.

The priority recovery and threat abatement actions required for this ecological community are identified below:

(a) Habitat loss, disturbance and modification

(i) Monitor known occurrences to identify key threats or the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

(ii) Identify occurrences of high conservation priority.

(iii) Undertake survey work in potential habitat to locate remnants.

(iv) Avoid mowing and slashing during peak flowering season from spring to summer.

(v) Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the ecological community.

(vi) Ensure road widening and maintenance activities (or other infrastructure or development activities) in areas where the ecological community occurs minimise adverse impacts on known sites.

[50] *Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin Approved Conservation Advice* approved by the Minister on 15/12/08, viewed 13 May 2014, www.environment.gov.au/biodiversity/threatened/communities/pubs/99-conservation-advice.pdf

(vii) Investigate and implement formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure.

(b) Invasive weeds

(i) Develop and implement management plans for the eradication of weeds such as Parthenium (*Parthenium hysterophorus*), Parkinsonia (*Parkinsonia aculeata*), Prickly Acacia (*Acacia nilotica* subsp. *indica*) and Buffel Grass (*Cenchrus ciliaris*).

(ii) Manage sites to prevent introduction of invasive weeds, which could become a threat to the ecological community, using appropriate methods.

(iii) Observe appropriate State protocols to avoid the spread of weeds. Implement good hygiene measures for mowing and grading equipment and take appropriate steps to avoid dispersing seeds when moving stock.

(iv) Maintaining a good cover of native perennial grasses and spelling the grasslands from grazing are reliable methods of managing the risk of weed invasion.

(c) Trampling, browsing or grazing

(i) Grazing management should focus on maintaining a good cover of perennial grasses and legumes, especially the most palatable species and carrying vegetation cover through the driest years.

(ii) Develop and implement a stock management plan for roadside verges and travelling stock routes.

(iii) Manage known sites on private property to ensure appropriate cattle and sheep grazing regimes are conducted outside the growing season, i.e. when plants are not fertile.

(d) Provide and/or promote incentives for good management

(i) Where possible, use an intermittent grazing regime in preference to burning. Avoid burning (or grazing or slashing) during peak flowering season (spring to summer).

(e) Animal predation or competition

(i) Develop and implement management plans for the control of the House Mouse (Mus spp.).

(f) Conservation information

(i) Raise awareness of the ecological community within the local community. The production of region specific fact sheets or information brochures could benefit land managers.

Part C. Approved conservation advice for king blue-grass *(Dichanthium queenslandicum)*[51]

The following regional priority recovery and threat abatement actions can be done to support the recovery of king blue-grass.

(a) Habitat loss, disturbance and modification

- (i) Monitor known populations to identify key threats.
- (ii) Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- (iii) Identify populations of high conservation priority.
- (iv) Ensure there is no disturbance in areas where king blue-grass occurs, excluding necessary actions to manage the conservation of the species/ecological community.
- (v) Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible.
- (vi) Manage any other known, potential or emerging threats, including mining practices, grazing, weed invasion and climate change.

(b) Invasive weeds

- (i) Develop and implement a management plan for king blue-grass for the control of parthenium (*Parthenium hysterophorus*) and parkinsonia (*Parkinsonia aculeata*) in the region.
- (ii) Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on king blue-grass.

(c) Trampling, browsing or grazing

- (i) Develop and implement a stock management plan for roadside verges and travelling stock routes.

(d) Conservation information

- (i) Raise awareness of king blue-grass within the local community, for example distribute fact sheets/information brochures or conduct field days in conjunction with known industry or community interest groups.
- (ii) Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions.
- (iii) Enable recovery of additional sites and/or populations.
- (iv) Undertake appropriate seed collection and storage.
- (v) Investigate options for linking, enhancing or establishing additional populations.

---

[51] A recovery plan is being prepared for the natural grasslands of the Queensland central highlands and the northern Fitzroy Basin ecological community.
Source: *Dichanthium queenslandicum (king blue-grass) Approved Conservation Advice* approved by the Minister for the Environment on 30 January 2013, viewed 13 May 2014, www.environment.gov.au/biodiversity/threatened/species/pubs/5481-conservation-advice.pdf

(vi) Implement national translocation protocols if establishing additional populations is considered necessary and feasible.

Part D. Approved conservation advice for Squatter pigeon (southern) *(Geophaps scripta scripta)*[52]

The following priority recovery and threat abatement actions can be done to support the recovery of the Squatter pigeon (southern).

(a) Habitat loss, disturbance and modification

(i) Monitor known populations to identify key threats.

(ii) Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

(iii) Identify populations of high conservation priority.

(iv) Manage threats to areas of vegetation that support important populations of the Squatter pigeon (southern).

(v) Protect populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure.

(b) Trampling, browsing or grazing

(i) Develop and implement a stock management plan for key sites.

(ii) Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the Squatter pigeon (southern).

(c) Animal predation or competition

(i) Implement the appropriate recommendations outlined in the *Threat Abatement Plan for Predation by Feral Cats* (EA, 1999a) and the *Threat Abatement Plan for Predation by the European Red Fox* (EA, 1999b) in areas inhabited by the Squatter pigeon (southern).

(d) Conservation information

(i) Raise awareness of the Squatter pigeon (southern) within the local community, particularly among land managers.

Part E. Approved conservation advice for star finch (eastern) *(Neochmia ruficauda ruficauda)*[53]

The star finch (eastern) is listed as endangered under the EPBC Act. The species is also listed as endangered under the NC Act. The current identified threats include the continued degradation of habitat by livestock; predation by introduced species such as feral cats (*Felis catus*) and European red foxes (*Vulpes vulpes*); invasive weeds; and poisoning by contaminants, such as cyanide, employed in mining operations.

The following priority recovery and threat abatement actions can be done to support the recovery of the star finch (eastern).

---

[52] Approved Conservation Advice for Geophaps scripta scripta (Squatter Pigeon (southern)) approved by the Minister/Delegate of the Minister for the Environment on 3 July 2008, viewed on 13 May 2014, **www.environment.gov.au/biodiversity/threatened/species/pubs/64440-conservation-advice.pdf**

[53] *Neochmia ruficauda ruficauda (Star Finch (eastern) Conservation Advice* approved by the Minister/delegate of the Minister on 26 March 2008, viewed 13 May 2014, www.environment.gov.au/biodiversity/threatened/species/pubs/26027-conservation-advice.pdf

(a) Habitat loss, disturbance and modification

(i) Monitor known populations to identify key threats.

(ii) Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

(iii) Identify populations of high conservation priority.

(iv) Manage threats to areas of vegetation that contain populations/occurrences of the star finch (eastern).

(v) Undertake survey work in suitable habitat and potential habitat to locate any additional populations.

(vi) Ensure chemicals or other mechanisms used in mining operations or to eradicate weeds do not have a significant adverse impact on the star finch (eastern).

(vii) Manage any disruptions to water flows, given that this subspecies requires seasonally inundated or damp habitat near permanent waterholes.

(viii) Minimise adverse impacts from land use at known sites.

(ix) Investigate formal conservation arrangements such as the use of covenants, conservation agreements or inclusion in reserve tenure, especially to reduce impacts of livestock grazing in key areas.

(b) Invasive weeds

(i) Develop and implement a management plan for the control of weeds, including exotic pasture grasses, in the local region.

(c) Trampling, browsing or grazing

(i) Develop and implement a stock management plan for roadside verges and travelling stock routes.

(ii) Prevent grazing pressure at known sites through exclusion fencing or other barriers.

(d) Animal predation or competition

(i) Develop and implement a management plan for the control and eradication of feral cats and European red foxes in the local region.

(e) Conservation Information

(i) Raise awareness of the star finch (eastern) within the local community.

(ii) Liaise with land managers to ensure that management practices comply with the requirements of the star finch (eastern).

Department of State Development, Infrastructure and Planning
PO Box 15517, City East Qld 4002
tel 13 QGOV (13 74 68)
fax +61 7 3452 7486
info@dsdip.qld.gov.au

www.dsdip.qld.gov.au